

INTERNATIONAL TRADE CONTROLS

1. General

During 1958 COCOM/CG effected a number of major revisions in the International (Security) Trade Control Program. First, new criteria were adopted which significantly modified the scope and depth of the trade controls toward the Sino-Soviet bloc. (TAB A) Second, the embargo (IL/I) list was reduced drastically in both numerical and substantive coverage. Third, the quantitative control (IL/II) and surveillance (IL/III) were abolished entirely and the items therein decontrolled. Fourth, a new watch list was established to cover a small number of items (35) derived primarily from the decontrolled embargo items. Fifth, the International "Munitions" List consisting of a listing of arms, ammunition and implements of war was revised to emphasize that only such items having direct military application or which were specially designed for the production of such items were considered to be covered by this control objective. Sixth, as the review of the Atomic Energy trade control list has not (November/December '58) been concluded, its result cannot be determined at this time. Seventh, such agreements having to do with administrative exceptions and enforcements that have been finalized reflect the general deterioration of effective controls in line with the overall results of the 1958 technical review and negotiations.

In the more controversial control area, i.e., International List I it should be noted that a numerical comparison between the new International Embargo List of 120 items and the former list is misleading because the magnitude of the reduction was much greater than the mere comparison of numbers would indicate. This is due to the adoption of definitions that either greatly narrow the coverage or open ways for evading and frustrating effective control. Results indicate that the over-all effective coverage of the former embargo list may have been reduced by as much as 70 to 80 percent.

The governing criteria, prior to the recent COCOM/CG negotiations, gave recognition to the strategic importance of the military/industrial base and thus provided for the inclusion in the control listings of a number of selected industrial/material items having key roles in an essential support capacity. The newly adopted criteria, however, did not give such recognition on the thesis that war was now limited in scope to a short highly destructive phase, prior to which there should no longer be a need for trade controls concerned with impeding the expansion of Sino-Soviet military support capability or the accumulation of materials to meet the requirements of a longer war. While the United States would not subscribe to this thesis it did nevertheless concur in the adopted criteria. Despite the general agreement to these new

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criteria important differences of interpretation exist. For example 106 whole items and 47 part items out of the 249 \* proposed by the United States for embargo were in disagreement at various stages of the COCOM review. Settlement of these disagreements were based on a number of reasons i.e., negotiation flexibility, tactics, political and economic rather than for basic security. These stresses which were apparent in the review are indicative of a far more basic difference of philosophy between the United States on one side and most of the Western European participating countries on the other. The review therefore did not produce a firm agreed doctrine underlying the Consultative Group's objective.

Past experience (China Differential) has proven that a considerable degree of control effectiveness can be directly related to administrative exceptions and enforcement procedures. It is not considered practical at this time to forecast the extent current controls will be effected by these measures. As it is the purpose of this document to present a technical analysis of the scope and depth of the current embargo (IL/I) control as compared with the former listing, it is believed sufficient at this point to record only that administrative terms were agreed upon which will permit a wider use of these techniques in evading the implementation of strict controls.

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- \* Selected originally on the basis of United States interpretation of the former criteria. It will be noted, however, the United States effort to retain control of these items during the review was related to the adopted criteria. Admittedly the case for retention was greatly weakened by the restrictions imposed and by the lack of specific economic intelligence.

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## 2. Technical Evaluation

The following analysis, limited to the COCOM List I embargo control, is intended to reveal the scope and depth of the recently adopted listing. It purposely omits reference to the new "watch" list as it will be recognized this listing will have no impact on Sino-Soviet plans and/or potential.

While the analysis includes comments on the strategic value of certain items or categories of items no attempt has been made to explain the reasons surrounding the settlement of disagreed items for the various reasons previously mentioned.

### Metal-Working Machinery

Metal-working machinery is of central importance to the achievement of military capability and the conduct of economic warfare. That the Soviets have substantially improved their position in this area is attested by the fact that currently they are "producing" more than 130,000 machine tools annually. While this production seemingly show that the Soviets have outstripped the United States in this respect many factors must be considered before accepting this in a true prospective, e.g., United States capacity for production, what kind and how modern are these tools, etc.

The United States machine tool industry annually is turning out tools which in their total productive capacity exceed by at least fifty percent the total productivity capacity of Soviet machine tools. Western European tools are at least equal, in quality, to those produced in the United States. To a considerable degree this is due to cross licensing and manufacturing agreements. The industry of the free world is reported to be now spending more money on research and development than at any time in its history to meet the demand brought about by advanced metallurgy, precision and automatic operation.

Recently released Soviet studies repeatedly makes references to shortages of certain categories and low productivity of Soviet machine tools. It is reported from Europe that the drastic reduction of control coverage in this category has resulted in a sharp increase in the interest by the Soviets to purchase late model/advanced type tools of all kind. As a minimum acquisition of such items will materially improve Soviet technology/capability in this category.

The export of Bloc produced items (at cut-rate prices) has been interpreted by some as indicating that the Bloc has reached a degree of self-sufficiency beyond effect of trade controls. This view fails to take account of Soviet economic warfare tactics where for political or propaganda reasons

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items needed to meet internal requirements are offered for export. It will also be noted the share of high productive tools in the total machine tool inventory of the USSR is about 6.5 percent, of which about 8 percent are employed in machinery building other than the production of machine tools, 9.7 percent in machine tool building and 19 percent in the automobile industry the output of which is to a degree diverted to meet military transportation demands, the balance being allocated to ordnance production.

In the absence of intelligence as to the degree of modernity incorporated in Bloc tools and to specific types and sizes in which the Bloc had reached a high degree of self-sufficiency it has been the position of the Defense Department that in view of the data presented above the entire category of modern high production, high precision tools meets the adopted criteria and should be subject to embargo. The problem of developing general specifications by which such tools could be identified remains to be solved.

The following item by item review reveals the changes between the former list and that recently adopted.

Former List      Item 1001

Vertical boring and turning mills as follows: (a) all types with table diameter exceeding 96"; (b) automatic types (automatic cycle)

New List      Mit

Deleted.

Former List      Item 1002 (see 1021)

Jig boring machines.

New List      Item 1002/1021

Redefined as follows: Jig boring and/or grinding machines (item 1021) with tables possessing any traverse (longitudinal, transverse or vertical) exceeding 44 inches.

Comment      Item 1002/1021

In the United States only one manufacturer, Pratt and Whitney, produces jig boring machines with traverse exceeding 44 inches. It has been determined that less than one percent of jig borers produced are of the size subject to current embargo. Relative to jig grinding machine no manufacturers in the U.S. produce machines of this type exceeding 44 inches.

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Former List      Item 1006

Deep hole drilling machines in which the coolant passes through the drill; and hollow drills for such machines.

New List          Item 1006

Retained without definition change.

Comment            Item 1006

It is not a machine in current demand due to the inventories built up for the production of World War I and I conventional weapons. There are deep hole drilling machines which do not provide for the coolant to pass through the drill and also there are drills which are used in these machines which are not hollow as specified by the definition. Such competitive substitute equipment, not subject to embargo, could completely frustrate the control that existed in the former list as well as that of the new list.

Former List      Item 1016

Internal grinding machines: (a) incorporating high frequency (over 60 cycle) spindles; (b) other types incorporating spindles with speeds in excess of 60,000 RPM and spindle assemblies.

New List          Item 1016

Redefined as follows: Grinding heads and spindle assemblies (consisting of spindle and bearings as a minimal assembly) designed or rated for operation at speeds in excess of 80,000 RPM, and machines specially designed for the utilization of such grinding heads.

Comment            Item 1016

What the new definition is to include and exclude is subject to considerable discussion. British designed units do not appear subject to the specifications of a minimal assembly. Should this be agreed it would not only frustrate the control but would penalize producers in other countries. The adoption of the 80,000 RPM cut-off is arbitrary and cannot be technically supported. The machines on which these heads are mounted are not specially designed as these heads are complete units and can be mounted on standard machines.

SECRET

Former List      Item 1017

Surface grinding machines, as follows: (a) multi-spindle, rotary table or work holder; (b) horizontal spindle, reciprocating table over 24" wide; (c) multi-spindle disc.

New List          Item 1017

Deleted.

Former List      Item 1019

Contour profile grinders.

New List          Item 1019

Deleted

Former List      Item 1021

Jig grinders.

New List          Item 1021

Combined with item 1002 (see comments under item 1002)

Former List      Item 1022

Lap radial grinders (automatic oscillating types) i.e., machines for grinding concave or convex surfaces such as those in ball bearing races.

New List          Item 1022

Deleted.

Former List      Item 1023

Roll grinding machines (machines fitted with, or capable of being fitted with, cambering devices only).

New List          Item 1023

Deleted.

Former List      Item 1025

Thread grinding machines

New List          Item 1023

Deleted.

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Former List      Item 1027

Grinding machines for broaching tools, auto cycle,  
auto sizing.

New List          Item 1027

Deleted.

Former List      Item 1039

Engine and center lathes over 18" center height and over  
18 feet between centers.

New List          Item 1039

Deleted.

Former List      Item 1040

Horizontal turret lathes of bar capacity 4" and over  
or swing-over-bed of 24" or more.

New List          Item 1040

Deleted.

Former List      Item 1041

Automatic lathes, multi-spindle bar or chucking.

New List          Item 1041

Deleted.

Former List      Item 1042

Right angle (T) lathes (in which the bed is at right  
angles to the spindle).

New List          Item 1042

Redefined as follows: Right angle (T) lathes (in which the  
bed is at right angles to the spindle) specially designed for  
making gas turbine discs.

SECRET

Comment            Item 1042

This is a standard general purpose item utilized to a great extent during World War II and Korea in the manufacture of turbine discs. The machines, however, are not limited to, neither are they specially designed for this purpose. The U.S. military departments are currently excessing substantial quantities of this item in favor of the more efficient automatic vertical boring mills (item 1001) which were deleted on the new list. In summary, there are no machine known that would qualify for control under the revised definition and should such machines exist now or in the future substitute machines, not subject to control, could frustrate the desired impact.

Former List        Item 1043

Combination tube boring and turning lathes.

New List            Item 1043

Deleted.

Former List        Item 1044

Combination lathe, drilling and milling machines, specially designed for mobile military workshops or for naval craft.

New List            Item 1044

Deleted.

Former List        Item 1050

Thread milling machines, 6" work diameter at the thread and over (except gun jump screw lathes covered by item 1086 J).

New List            Item 1050

Deleted.

Former List        Item 1051

Spar millers

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New List            Item 1051

Retained unchanged.

Comment

Spar millers were required in the manufacture of World War II combat type military air craft as well as commercial versions. Current use is generally restricted to civil or commercial aircraft. Any country manufacturing aircraft in any quantity during the war period noted above would therefore have sufficient spar millers to meet any current or future demand for civil aircraft requirements. The retention of this item under control cannot be considered to have any effective impact.

Former List        Item 1052

Planing machines, planer milling machines and combination planer and planer milling machines with capacity for work pieces 72" wide and over or 20' long and over.

New List            Item 1052

Deleted.

Former List        Item 1053

Armour plate planer.

New List            Item 1053

Deleted, transferred to Munitions List, item 18.

Former List        Item 1065

Military-type jigs, fixtures and plate metal working accessories (except machines).

New List            Item 1065

Deleted, transferred to Munitions List, item 18.

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Comment           Item 1065

As it is normal practice to design and custom build this type of equipment, it is unlikely any trade between the West and the Sino-Soviet bloc will exist relative to this commodity.

Former List       Item 1070

Forging hammers, as follows: (a) having a falling weight exceeding 6 tons; (b) steam, air or mechanical hammers of rated size exceeding 5 tons.

New List           Item 1070

Revised as follows: Forging hammers as follows: (a) having a falling weight exceeding 10 tons; (b) steam, air, or mechanical hammers (except counter-blow hammers) of rated sizes exceeding 10 tons; (c) counter-blow hammers of rated sizes of 25,000 kilogram/meters or English equivalent or more; (d) horizontal impact hammers hydraulically actuated of rated sizes of 10,000 foot pounds or more.

Comment           Item 1070

Hammers having a falling weight that exceeds 6 tons are not produced in the United States. Steam, air and mechanical hammers exceeding 5 tons and under 10 tons are the type and size most commonly used in military end item production. The 25,000 kilogram/meter counter-blow hammer is equivalent to the 80,000 foot pound hammer which the United States obtained by reparation from the Germans. There are no known larger machines currently in use, therefore the addition of this sub-item with its present cut-off to the new listing is without meaning. As the horizontal impact hammer is made by only one manufacturer (US) in the West the COCOM Pc's readily agreed to its embargo as it would not effect their trade possibilities with the Bloc. It has not been determined if all sizes are covered by the 10,000 foot pound cut-off thus it is possible the technology involved in this newly developed item may be lost.

Former List       Item 1072

Presses, mechanical or hydraulic, with rated pressures of over 1000 tons.

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New List            Item 1072

Presses, mechanical or hydraulic, with rated pressures of over 5000 tons.

Comment            Item 1072

Whereas the former list cut-off of 1000 ton pressure released all but a small percent of presses normally used in the production of strategic end items, the raising of the cut-off to 5000 tons pressure would retain control only over such presses as are now included in the Air Force heavy press program. As these represent only a fraction of one percent of the total Defense press inventory the resultant control can be considered to have little "impact" value.

Former List        Item 1073

Machinery for drawing and/or tempering wire .015" in diameter or less or tubing .026" in diameter or less.

New List            Item 1073

Deleted.

Former List        Item 1075

Spinning lathes, except those with a spindle drive motor of 10 HP or less.

New List            Item 1073

Spinning lathes, except those with a spindle drive motor of 25 HP or less.

Comment

It is doubtful that any trade will develop for machines of this type. Forms developed by spinning can be produced by other processes not subject to trade embargo. The raising of the HP cut-off from 10 to 25 HP as recommended by the British was not checked for technical justification.

SECRET

Former List      Item 1080

Machines and equipment specially designed for the making or mating gas turbine blades, including but not limited to the following: (a) blade belt grinding machines; (b) blade edge radiusing machines; (c) blade polishing machines; (d) blade aerofoil milling and/or grinding machines; (e) blade fillet radiusing and/or platform forming machines or equipment; (f) blade root milling machines; (g) blade blank preforming machines; (h) blade rolling machines; (i) blade aerofoil shaping machines; (j) blade aerofoil scribing machines; (k) blade aerofoil and/or root measuring equipment.

New List      Item 1080

Retained without change.

Comment

It must be pointed out that the described machines and equipment to be covered by embargo control must be "specially designed" for the production of the identified product, i.e., gas turbine blades. Many of the machines that are performing the definition operations currently in the United States are not specially designed, it is the fixtures on standard machines that provide the means to perform these various operations. This "loophole" could frustrate the intent of this item control.

Former List      Item 1031

Special machinery for the working, forming of aircraft sheet, plate or extrusions.

New List      Item 1081

Retained without change.

Comments

See comments under item 1080 and item 1051.

Former List      Item 1084

Equipment designed for removing surplus stock from workpieces of metal or other materials: (a) by the discharge of electric sparks from a shaped electrode; (b) by applying ultrasonic vibrations; (c) by electrolytic means in combination with abrasive action.

SECRET

New List           Item 1084

Deleted.

Former List       Item 1086

All machines and equipment specially designed for manufacturing armaments (i.e., arms, ammunition and implements of war).

New List           Item 1086

Redefined as follows: Machine specially designed for the manufacture of jet engines, the following: (a) jet engine case boring machines; (b) jet engine compressor and turbine disc turning machines; (c) jet engine rotor grinders.

Comment

While it is possible to specially design and custom build machines to perform the functions described in the definition machines not so designed and built are commonly used for these operations. It will be further noted the use of these machines are not restricted to the manufacture of the products described and limited by the definition. As indicated in the comments relative to item 1080 the "loophole" in the definition allows for the frustration of the intended coverage of this item.

Former List       Item 1087

External surface broaching machines; and external surface broaching tools.

New List           Item 1087

Redefined as follows: External surface broaching tools specially designed for the production of jet engine blades and discs.

Comment

It is doubtful that such tools could or would be identifiable as specified by the revised definition. The loss of control over broaching machines is most significant in view of the increasing use of this process where high uniform production is involved.

SECRET

Former List      Item 1088

Gearmaking machinery: all machinery designed for the manufacture and/or finishing of machine cut gears (except hobbing machines of 48" maximum work diameter or less, and gear grinding machines of a non-generating type).

New List      Item 1088

Redefined as follows: Gearmaking and/or finishing machinery, as follows: (a) gear grinding machines, generating type, of 36 inches work diameter and above; (b) capable of the production of gears of a module finer than 0.5mm (diametral pitch finer than 48").

Comment

Relative to the revised highly restrictive coverage of sub-item (a) the cut-off of 36 inches fails to embargo any gear grinding machines produced by any of the COCOM countries. Basic justification for the control of gear grinding machines stems from military requirements as relative few gears produced for civilian use are ground. Military requirements for heat treated gears requiring grinding for final precision finish are increasing and sizes cover the range below rather than above the 36 inch work diameter established as a cut-off in the revised definition. As to sub-item (b), while the intent is limited to the manufacture of small fine pitch gears, gearmaking machinery is classified by pitch diameter production capability rather than by "diametral pitch finer than 48" that properly describes types of finished gears. Therefore considerable doubt has been expressed that machines can be identified for control purposes. By limiting the control to small fine pitch gear production machinery that represents only a small portion of the overall direct military requirement for gears the impact of the retained control must be recognized as very limited indeed.

Former List      Item 1089

Honing machines with multiple work stations.

New List      Item 1089

Deleted.

SECRET

Former List      Item 1090

Profiling and duplicating machinery as follows: (a) die-sinking machines; (b) profiling machines for marine and aircraft propeller blades (planing, shaping, milling or grinding); (c) profiling and duplicating milling machines (except types covered by (b)); (d) profiling machines, n.e.s.; (e) attachments for center lathes, milling machines and vertical borers, which make them capable of carrying out profiling and duplicating (except taper turning attachments).

New List      Item 1090

Deleted.

Former List      Item 1091

Not included.

New List      Item 1091

New item: Electronic closed loop feed back controls for machine tools (cutting and forming) in which a continuous feed back of information from the work piece or tool or work piece carrier or tool holder itself results in continuous correction of the control commands, and machine tools incorporating such controls.

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SUMMARY OF THE REVIEW OF THE METAL--WORKING CATEGORY (000)

Original number of items	34
Items deleted from control	19
* Items redefined and retained	9
** Items retained without change	4
Items transfered to Munitions List	2
New items added	1

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- \* In all cases the redefinition provided for cut-offs that for all practical purposes eliminated effective control where possible trade exist or restricted the control to specially designed tools for the production of specific end items when in fact such machines are rarely identifiable.
  - \*\* The items retained without change in definition originally contained deficiencies noted under \* above, thus the new list contains 13 items of extremely limited scope and depth.

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CHEMICAL AND PETROLEUM EQUIPMENT

1. Chemical Equipment.

Prior to the COCOM/CG 1958 review the chemical equipment category had already been greatly weakened by a maze of qualifying restrictions of a structural or technological nature. The limitations were such that relative few items were subject to embargo. The embargo controls have now been reduced to almost complete ineffectiveness as a result of the review.

In general, the Sino-Soviet bloc chemical/petro-chemical equipment industry has lagged behind the West in its level of technological achievement. Since a modern military potential requires the support of a large and complex chemical industry it can be assumed that the Bloc's latest attempt to procure from the West vast amounts of the most modern chemical equipment is to a large extent motivated by both military and political design. At the present level of the international trade controls in this area the Bloc should not experience any serious restriction to achieving its planned objective.

The following item by item review and discussion points up the nature of the new control:

Former List                      Item 1101

Equipment specially designed for the production of nitrogen tetroxide and/or its conversion to nitric acid of 98 percent or higher concentration.

New List                              Item 1101

Redefined as follows: Equipment specially designed for the conversion of nitrogen tetroxide to nitric acid of 98 percent or higher concentration, or for the concentration of nitrogen tetroxide and/or nitric oxides or mixture thereof.

Comment

As noted the review reduced the scope of the original comprehensive coverage of all production equipment to only that used for conversion and concentration. In view of the developing use of nitrogen tetroxide as a highly satisfactory missile fuel the loss of coverage is significant. This item has clear (before revision) military application and is believed to meet the qualifications of the adopted criteria.

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Former List            Item 1106

Centrifugal counter-current solvent extractors.

New List              Item 1106

Redefined as follows: Centrifugal counter-current solvent extractors specially designed for the extraction of radio active substances.

Comment

Technicians, subsequent to the review, have been unable to identify equipment that would qualify control under the revised definition. Control of this type equipment used in atomic energy production is covered by a separate Atomic Energy embargo listed item, therefore it appears the revised item 1106 is in fact a duplication. The effect of the revision is the elimination of all counter-current solvent extractors used in the chemical/petro-chemical from embargo control.

Former List            Item 1110

Gas-liquefying equipment, as follows: (a) liquid oxygen or liquid hydrogen producing plants specially designed to be mobile or transportable in one or more units; (b) liquid fluorine producing equipment; (c) equipment for the separation of helium from methane.

New List              Item 1110

Redefined as follows: Gas liquefying equipment, as follows: (a) equipment, n.e.s. specially designed for the production of gases in liquid form, capable of operating at pressures of 300 PSI or over, and producing one ton or more per day of gas in liquid form, except: (1) plants not capable of producing more than 25 percent of their total daily product as extractable gas in liquid form; (2) plants specially designed for liquefying chlorine and ammonia; (3) stationary equipment for liquefying carbon dioxide; (4) equipment for liquefying low molecular weight refinery gases. (b) Liquid fluorine producing equipment; (c) equipment for the separation of helium from natural gases.

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Relative to sub-item (a): While most equipment of this nature operates at over 300 PSI recently developed generators (for the U.S. Corps of Engineers) operating at 80 PSI would not be subject to embargo. While in total the relaxation of control in this item redefinition may not be great in terms of equipment freed from embargo due to the strategic importance of this equipment directly related to military applications any reduction should be viewed with concern. It has not been determined what effect the exceptions may have on effective control, however, as there is a considerable degree of similarity in all liquefying equipment (and components) any exception could have a serious frustrating effect.

## Former List      Item 1112

Equipment for the production of hydrogen and deuterium oxide, as follows: (a) complete installations capable of producing hydrogen by the electrolytic process at a rate of 30,000 cu. ft. or more per hour; (b) equipment for production or concentration of deuterium oxide; (c) electrolytic cells for the production of hydrogen at a rate of 60 cu. ft. or more per hour.

## New List          Item 1112

Redefined to read as follows: Equipment for the production and/or concentration of deuterium oxide.

Comment

At the time of the COCOM/CG review of the international embargo list it was agreed the retained sub-item (b) of the former list would be further examined during the review of the Atomic Energy List. As this material is used as a moderator in reactors which may be used either for the production of electric energy alone or for the production of embargoed fissionable material as well as electric energy it may not be possible to retain this item in view of the pressure to relax strategic trade controls. It will be noted that sub-items (a) and (c) of the former list have been deleted in the new listing.

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Former List                      Item 1118

Equipment for the production of military explosives, as follows: (a) complete installations; (b) specialized components (Interpretative Note 4); (c) nitrators: batch type with a capacity of 125 imperial gallons or more and continuous types.

New List                        Item 1118

Redefined to read as follows: Equipment for the production of military explosives, as follows: (a) complete installations; (b) specialized components (Interpretative Note 4); (c) nitrators: continuous types.

Comment

Batch type nitrators, deleted from the new control listing, have clear military application since equipment of this type is generally used by both the United States and the Soviets for the production of military explosives rather than the continuous type that has its use in meeting the demand for sustained and heavy replacement of munitions inventory.

Former List                      Item 1125

Plant for the production of titanium metal (excluding separate plant for the production of titanium tetrachloride); as follows: (a) complete installations; (b) specialized components.

New List                        Item 1125

Redefined as follows: Plant for the production of titanium and/or zirconium metals (excluding separate plant for the production of titanium tetrachloride or zirconium tetrachloride), as follows: (a) complete installations; (b) specialized components; (c) electric furnaces specially designed for the recovery of titanium or zirconium from scrap.

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Comment

At the time of the COCOM/CG review it was agreed to re-examine this item during the review of the Atomic Energy lists. Originally this item covered only equipment for the production of titanium metal. It has now been expanded (at least until the result of the Atomic Energy list review has been finalized) to include equipment for the production of zirconium metal. It is doubtful an effective control has been or will be exercised in the absence of an agreed illustrative list of involved equipment. Not only are there process variations in the basic Kroll technique but added techniques have been or are in the process of development each having its own bill of equipment.

Former List                      Item 1130

Compressors n.e.s. of 300 HP or more capable of delivering air, gases or vapours at pressures exceeding 450 PSI.

New List                        Item 1130

Deleted (see item 1380)

Former List                      Item 1131

Pumps (except vacuum) delivering liquids separately or in combination with solids and/or gases and having any of the following characteristics: (a) designed to move molten metals by electromagnetic forces; (b) having all flow contact surfaces made of any of the following materials: (1) 90% or more tantalum, titanium or zirconium either separately or combined; (2) 50% or more cobalt or molybdenum either separately or combined; (3) 10% or more silicon (as metal alloy; (4) polytetrafluoroethylene; poltrifluorochloroethylene; (c) designed to produce pressures of 450 PSI or more and having an inlet connection greater than 3 inches internal pipe size.

New List                        Item 1131

Redefined to read as follows: Pumps (except vacuum pumps) delivering liquids separately or in combination with solids/and or gases and having any of

the following characteristics: (a) designed to move molten metals by electromagnetic forces; (b) specially designed for operation at temperatures below - 130° C; (c) having all flow contact surfaces made of any of the following materials: (1) 90 percent or more tantalum, titanium or zirconium, either separately or combined; (2) 50 percent or more cobalt or molybdenum, either separately or combined; (3) polytetrafluoroethylene; polytrifluorochloroethylene \*.

Comment

Item 1131

At the time of the COCOM/CG review it was agreed to further examine new list sub-item (c)(3) during the Atomic Energy List review. It will be noted that the electromagnetic pump is also associated with atomic energy functions. Relative to Former list sub-item (b)/New list sub-item (c) while it may be possible to construct pumps having all contact surfaces made of the specified materials research has failed to disclose that such pumps are produced or are essential for "delivering liquids separately or in combination with solids and/or gases." The addition of a new sub-item (b) definition covering pumps designed for low temperature operation represents one of the few gains realized as a result of the review. This component is related to item 1110. The deletion of former list sub-item (c) tends however to wash out the gain noted above. In summary the cut-offs and qualifications which have been in existence since the 1954 COCOM list review continues to preclude any effective embargo of pumps.

Former List

Item 1132

Vacuum pumps, all types, designed to produce a vacuum of 0.01 mm of mercury pressure absolute or less (except (1) those covered by the Atomic Energy list and (2) mechanical types having a capacity of less than 60 litres free air per minute) and specially designed parts.

New List

Item 1132

Deleted.

Comment

Item 1132

Disposition of Atomic Energy list item 26 covering a specific type vacuum pump has not been resolved. There remains a possibility, however, that it may be transferred to International List I, thus re-establishing item 1132.

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Former List                      Item 1133

Pipe valves and cocks having all flow contact surfaces made of any of the following materials: (a) 90% or more tantalum, titanium or zirconium, either separately or combined; (b) 50% or more cobalt or molybdenum, either separately or combined; (c) 10% or more silicon (as metal alloy); (4) polytetrafluoroethylene; polytrifluorochloroethylene. (Note: the following types of valves are excluded: (1) check, non-return and float valves; (2) pressure relief valves designed for working pressures of less than 450 PSI; (3) valves and cocks specially designed for milking machines and for electrical household refrigerators and home freezers.

New List                        Item 1133

Redefined to read as follows: Valves, cocks and pressure regulators, n.e.s. as follows: (a) specially designed to operate at temperatures below - 130°C. or (b) incorporating any of the following materials: (1) 90 percent or more tantalum, titanium or zirconium, either separately or combined; (2) 50 percent or more cobalt or molybdenum, either separately or combined; (3) Polytetrafluoroethylene; polytrifluorochloroethylene.

Comment                      Item 1133

See comments relative to item 1131. It has not been determined whether or not products as described are produced, to what extent they are essential to the chemical industry, existence of satisfactory substitutes not subject to control.

Former List                      Item 1142

Pipe and tubing made of or lined with polytetrafluoroethylene, or polytrifluorochloroethylene.

New List                        Item 1142

Retained without change in definition.

Comment                      Item 1142

At the time of the COCOM/CG List I review it was agreed to further examine this item during the Atomic Energy list review.

Former List                      Item 1145

No coverage.

New List                        Item 1145

New item: Containers, jacketed only, for the storage or transportation of liquefied gases, including mobile units, of 500 gallons capacity or over, designed for liquid nitrogen, oxygen, hydrogen, ozone, helium and argon.

## 2. Petroleum Equipment

Former List                      Item 1150

Oil well drilling and exploration equipment. Interpreted to include the following: (a) casing head and Christmas tree assemblies; (b) cementing equipment; (c) coring equipment; (d) gun perforating equipment; (e) photo-clinometers; (f) power pumping units (mud and sludge) and bottom hole pumps; (g) blowout preventers; (h) drill bits (rock bits); (i) draw works and rotary tables; (j) well logging instruments and equipment; (k) drill collars, tool joints, Kelly's and Kelly substitutes; (l) crown blocks, traveling blocks for oil derricks; (m) rotary vibrator hose and rotary drilling hose, high pressure (with test pressure 3000 PSI).

New List                        Item 1150

Redefined to read: Rotary rock drill bits (i.e., having cones or sections which rotate freely and independently of the rotation of the body of the bit).

Former List                      Item 1151

Equipment for the production of lubricants (petroleum based or synthetic), as follows (and complete plants including any of these units); (a) solvent processing units (including phenol, duosol, fufural and nitrobenzene solvent extraction and propane deasphalting units); (b) dewaxing units (including centrifugal and solvent dewaxing units, such as methylethyl ketone and propane units); (c) filtration units (including percolation filtration, contact filtration and filtrol fractionation units), (d) fractionating, rectifying, and dephlegmating columns and parts thereof, (e) hydrogenation equipment



(complete installations and specialized components)  
designed to operate at pressures of 360 PSI or over,  
(except equipment specially designed for the production  
of ammonia or methanol).

New List           Item 1151

Deleted.

Former List       Item 1152

Mineral oil and natural gas treatment equipment, as  
follows: (a) units for treating, separating and  
stabilizing and natural gas extraction; (b) complete  
plants including any of the above units; (c) items of  
equipment specially designed therefor (including, but  
not limited to, the following, stabilizing, absorption,  
and stripping vessels; separators; condensers).

New List           Item 1152

Deleted.

Former List       Item 1153

Fuel production equipment, as follows: (a) processing  
units of types suitable for the production of com-  
ponents of aviation fuels for reciprocating engines  
(including alkylation, thermal and catalytic cracking  
and reforming units, isomerization, aromatization,  
dehydrogenation, hydrogenation, and polymerization  
units); (b) complete plants including any of these  
units.

New List           Item 1153

Deleted.

Former List       Item 1154

Welded or seamless steel drill pipe, conforming with  
API specifications for oil country tubular products.

New List           Item 1154

Deleted.

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SUMMARY RESULTS OF LIST REVIEWChemical and Petroleum Equipment Category

Original number of items	16
Items deleted	6
Items redefined	9
Items retained without change	1
New items added	1

Prior to the review a fairly comprehensive control existed over processing equipment for the production of petroleum products. The COCOM review resulted in almost the total elimination of embargo of this equipment. Access to this equipment will provide the Bloc means for not only improving products for its internal use but also to increase its competitive position with West petroleum processors.

The tentative Seven-Year Plan (1959-1965) virtually doubles the share of investment going to chemicals as compared with the past seven year period. Fulfillment of the plan, however, will depend in large measure on the success achieved in developing the petrochemical industry. This is an area in which the Soviets have traditionally lagged, and achievement of the target seems improbable unless substantial assistance in the form of petrochemical technology and equipment is procured from the West. Current controls present no obstacle to such acquisition.

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ELECTRICAL AND POWER GENERATING EQUIPMENT

The main task of the "new period which the USSR is entering, (the Seven-Year Soviet Economic Plan) the period of large-scale building of Communist society," is as follows: "creation of the material-technical basis of communism, the further strengthening of the economic and defense might of the USSR". Mr. Khrushchev recently commented on the fact that the need for electric power was one of Russia's greatest and that although she was achieving remarkable increases in that area, she was still so far behind the West in this regard that the expansion program must be radically increased. A preliminary appraisal of the Seven-Year Plan (1959-1965) reveals the ambitious 1965 goal for electric power production in the USSR of 500-520 billion kilowatt hours.

Former List                      Item 1210

Searchlight control units.

New List                        Item 1210

Transferred to Munitions List.

Comment                        Item 1210

As this equipment is considered obsolete with little if any trade prospect, it was the original position of the United States that no meaningful effect would result from retaining this item on any list.

Former List                      Item 1255

Diesel engines, as follows: (a) 1500 HP and over with rotary speed of 600 RPM or over (except those incorporated in generator sets); (b) 50 HP and over whose non-magnetic content exceeds 50 percent of their total weight.

New List                        Item 1255

(Sub-item (a) transferred to Munitions list item 9 (b)(1). Retained item 1255 now reads: Diesel engines, 50 HP and over, whose non-magnetic content exceeds 50 percent of their total weight.

Comment                        Item 1255

Redefined item 1255 covers diesel engines specially designed for minesweeping and should qualify for Munitions list control as did the former sub-item (a) that covered a type of diesel engine designed for use in submarines. During 1956 a total of 127,103 diesel engines of 50 HP or more were produced in

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27

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the United States. Of this number fewer than 25 were produced (for the U.S. Navy) that meet the specifications of redefined item 1255.

Former List                      Item 1260

Electric motors over 1000 HP, reversing type, liquid cooled and totally enclosed.

New List                        Item 1260

Transferred to Munitions List item 9(B)(2).

Comment                        Item 1260

This item covered electric motors specially designed for use in submarines.

Former List                      Item 1266

Rotating electrical machinery, as follows: (a) electric generators, turbo generators, turbines designed for turbo generators and synchronous condensers of 6000 KW and over; and specially designed parts; (b) electric motors of 12500 HP and over; and automatic and semi-automatic equipment for starting, stopping, reversing and speed control for these motors.

New List                        Item 1266

Redefined to read: Electric power generating mobile units of over 5000 K.W.

Comment                        Item 1266

Unless the power generating element is mounted on a mobile conveyance it would not qualify for embargo as a "mobile unit," therefore there is no control restrictions on separate power generating equipment of over 5000 K.W.

It was the United States position at the review that all motor generator sets of  $\frac{1}{2}$  KW to 5000 KW should be subject to embargo. The United States case, based on the new criteria, was based on the fact that during 1955-1956 out of \$40,000,000 worth of this equipment produced in the United States \$37,000,000 was delivered to the military departments for use in missile launching sites, communications networks, radar centers and in other direct military applications. Despite the evidence of clear military application

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the coverage was placed on the watch list. Trade reports for 1 month after the review reflects considerable trade in this type equipment.

SUMMARY RESULTS OF LIST REVIEW  
Electrical and Power-generating Equipment

Original number of items	4
Transferred to Munitions List	3
Redefined (in part)	2

No effective coverage remains in this category.

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GENERAL INDUSTRIAL EQUIPMENT CATEGORY

As previously indicated the adopted criteria limited the inclusion in the embargo listing of general industrial equipment to a degree that the scope of coverage has been materially reduced.

Former List                      Item 1305

Metal rolling mills, all types, and controls therefor.

New List                        Item 1305

Metal rolling mills as follows: (a) having the work rolls supported by multiple back-up rolls or bearings; (b) having multiple work rolls rotating in a planetary form around the back-up rolls; (c) continuous cold sheet and strip mills of more than 3 high.

Comment                        Item 1305

Prior to the negotiations all rolling mills employed in the hot or cold processing of ferrous and non-ferrous metals, starting with an ingot, into blooms, billets, slabs, kelp, structural shapes, rods, rails, plates, foil, tube, sheet, bars, strip were subject to embargo control. These various type mills consisting of roll stands, rolls, guides, motors for the rotation of the rolls, gear trains, approach tables, run-out tables, manipulators, edgers, up-coilers, down coilers, tension and pay-off reels, lubrication systems, cooler systems, special bearings and controls consisting of electric, electronic, hydraulic and mechanical devices separately or in combination required to complete the planned Soviet goals has been greater than their production capability. As a result of the negotiations and redefinition of the scope of the embargo control it is estimated the remaining control represents as an investment and workload less than 1% of the Bloc's planned requirements. The relaxation will permit the Bloc to import such requirements as may be needed to off-set their production deficiency and thus frustrate any control that is represented in the new listing. It will be recognized that a significant loss of technology could result from the reduced scope and depth of control in this area. As this was a "political" item its partial retention on the embargo listing was accomplished without strict interpretation of criteria.

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Former List                      Item 1321

Tractors, 4-wheel drive, 100 HP and over.

New List                        Item 1321

Deleted

Former List                      Item 1322

Soil compacting equipment, as follows: (a) soil compactors with pneumatic tired wheels, vibrating type, of 30,000 lbs. net vehicle weight or over; (b) pneumatic tire casings for such soil compactors (whether or not mounted on the vehicle) of 16.00 x 21 size or over and rated 36 play or over.

New List                        Item 1322

Deleted

Former List                      Item 1325

Excavating and moving equipment, as follows, when specially designed for airborne transport: (a) excavators, (b) power shovels, (c) cranes.

New List                        Item 1325

Redefined to read: Construction equipment built to military specifications specially designed for airborne transport.

Comment                        Item 1325

This item could qualify for transfer to the Munitions List as presently defined. The United States is possibly the only COCOM country producing equipment which would qualify for embargo under the revised definition.

Former List                      Item 1350

Carbon black furnaces, controlled atmosphere types, intermittent or continuous.

New List                        Item 1350

Deleted.

SECRET

Comment                      Item 1350

This item was deleted despite a strong case based on technology and a Bloc shortage of quality carbon black essential for the production of long life tires.

Former List                      Item 1353

Cable-making machinery specially designed for making multipair electric cables for telecommunications purpose, as follows: (a) machinery, other than that covered by item 1354 for applying insulating material to conductors; (b) machinery for laying conductors together and/or for applying and insulating, separating, binding, or identifying material thereto; (c) machinery for laying up conductors, pairs, quads, etc., together to form the complete cable core or parts thereof.

New List                      Item 1353

Retained on new list without change in definition.

Former List                      Item 1354

Cable-making machinery specially designed for making coaxial cable, as follows: (a) machines for applying insulating separators to the inner conductor of air-spaced coaxial electric cables; (b) machines for applying metal strip or sheet to form the outer conductor of coaxial electric cables; (c) machines for forming, stranding, or assembling coaxial cable, with or without conductors other than coaxial tubes; (d) automatic equipment for controlling the diameter or the eccentricity of extruded dielectric on wires and cables.

New List                      Item 1354

Retained on new list without change in definition.

Former List                      Item 1355

Radio-valve manufacturing machinery.

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New List Item 1355

Redefined to read as follows: Electronic valve making machinery as follows: (a) machinery, equipment and test gear specially designed for the manufacture of the various types of embargoed electronic valves, transistors and crystal diodes (including components or sub-assemblies therefor); (b) machinery, equipment and test gear specially designed for the automatic or semi-automatic assembly of electronic valves transistors and crystal diodes (including components and sub-assemblies therefor.)

Comment Item 1355

There was strenuous objection to the sub-item (a) definition. It being contended that little if any machinery, equipment etc., specially designed and produced to manufacture specific electronic components such as are listed for embargo. The recommendation that the definition should read "--- capable of manufacturing the various embargoed components," etc., was rejected. As it is difficult to draw a distinction between the terms "manufacture" used in the sub-item (a) definition and "assembly" used in the sub-item (b) definition, it appears that some confusion could result in attempting to determine under what sub-item an item of equipment would qualify for embargo or be exempt from such control. Clarification of these two sub-item definitions is required if the control is to be effective.

Former List Item 1360

None.

New List Item 1360

New item: Equipment specially designed for purifying and processing silicon and germanium except equipment designed for the zone purification of germanium.

Comment Item 1360

Technical evaluation as to the probable effect of this control is not available, however, it appears that little if any will result. It is reported the Soviets have the know-how to purify either silicon and germanium. It will be noted that only the highest purity silicon or germanium is now subject to control.

Former List                      Item 1380

Compressors and blowers as follows: (a)(1) turbo-compressors or blowers capable of operating with a mainstream internal air flow exceeding a Mach No. of 0.9; (2) turbo-compressors or blowers of axial flow type with a compression ratio of 2:1 or more and capable of operating with a mainstream internal air flow exceeding Mach No. 0.7; (b) compressors or blowers capable of an overall compression ratio of 2:1 or more coupled with a capacity of over 124000 cu. ft. per minute, or capable of an over-all compression ratio of over 3:1 coupled with a capacity of over 35,300 cu. ft. per minute; (c) compressors or blowers capable of handling a mass flow of over 2500 lbs. per minute and designed for operating with intake above atmosphere pressure.

New List                        Item 1380

Redefined to read as follows: Centrifugal and axial flow compressors or blowers capable of an overall compression ratio of 2:1 or more coupled with a capacity of over 372000 cu. ft./mm. or an over-all compression ratio of 3:1 with a capacity of 106000 cu. ft./mm.

Comment                        Item 1380

Embargo of all known centrifugal, axial flow compressors or blowers used in industrial applications has been eliminated by the specified cut-offs. It is not believed that any requirement will exist for the described equipment. Future windwind tunnels will operate in a manner that will not require such equipment.

Former List                      Item 1385

Diamonds suitable for industrial use, including splints and borts. (Note: Interpreted to include industrial diamonds, dust and powder. Also interpreted to include rough cutting diamonds suitable either for gem stones or industrial diamonds).

New List                        Item 1385

Deleted.

Former List                      Item 1386

Diamond wire drawing dies, diamond dressers, diamond boring and turning tools, and diamond core drill bits.

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New List                    Item 1386

Deleted.

Former List                Item 1387

Diamond grinding wheels, sticks, hones and laps.

New List                    Item 1386

Deleted.

Comment                    Items 1385-86-87

It will be noted that in the first month after these items were deleted from embargo control 8266 carats, diamonds suitable for industrial use, valued at \$194,488 were exported to the Bloc.

Summary Results of Review of the  
General Industrial Equipment Category

Original number of items	12
Items deleted	6
Items redefined providing for greater relaxation	4
Items retained without change	2
New item added	1

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TRANSPORTATION CATEGORY

Despite a general agreement in NATO that Soviet reliance on a barely adequate land, sea and air transportation system is a major weakness having a direct bearing on its military potential, the COCOM review resulted in a radical reduction of control scope and depth.

Former List                      Item 1401

Floating docks.

New List                        Item 1401

Deleted.

Former List                      Item 1405

Icebreakers of 2000 shaft HP and over, and similar vessels principally designed for breaking ice having any of the following: (a) bow propeller; (b) special hull shape; (c) propulsion plant permitting quick reversing and development of maximum power at all speeds; (d) stem saddle arrangements for towing operations; (e) excessive electrical supplies and pumping facilities.

New List                        Item 1405

Redefined to read: Ice breakers of 10000 shaft H.P. and over.

Comment                        Item 1405

The following is a recent tabulation of the world icebreaker fleet:

10000 shaft HP and over	22
Under 10000 shaft HP	42

According to the new definition the present world fleet is composed of 34% of icebreakers of 10000 shaft HP and over. This means that 66% of the present world fleet are not now under embargo control.

Former List                      Item 1410

Tankers; tank barges; whaling factories.

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New List Item 1410

Redefined to read: Tankers designed for speeds of more than 18 knots when in full load (design) condition.

Comment Item 1410

The following is a recent tabulation of the world tanker fleet:

Total number tankers world fleet (1000 GRT upward)	<u>5746</u>
Total number tankers world fleet over 18 knots speed	<u>4</u>
For all practical purposes this new control cut-off reduces effective control to <u>zero</u> .	

Former List Item 1415

Warships (whether or not converted to non-military use and regardless of current state of repair or operating condition); and hulls, or parts of hulls, or parts of hulls, for such ships.

New List Item 1415

Retained without change.

Former List Item 1416

Fishing vessels and hulls therefor, having any of the following specifications: (a) wood or other non-magnetic hull of 60 feet or more in length between perpendiculars unless built before 1939, in which case 100 feet or more in length; (except the following vessels when their speed is not more than 10 knots and their electric generating capacity is under 35 KW: (1) bonito and tuna vessels under 130 feet in length between perpendiculars, either fitted with sponson platforms for line fishing or of the long line type; (2) seal fishing vessels under 130 feet in length; (d) fishing cutters. (Scandinavian type) under 100 feet in length; (b) 200 feet or more in length between perpendiculars; (c) maximum speed in deep load condition of  $12\frac{1}{2}$  knots or more; (d) total round trip range at design speed above 7000 miles, in fishing condition; (e) incorporating any of the following special features: (1) deck or hull strengthening for weapons or special construction to accommodate or carry military equipment; (2) hull design suitable for direct beachings;

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(3) bow or stern doors; (4) any arrangements for demagnetizing or the provision of non-magnetic characteristics; (5) electrical generating capacity in abnormal excess of the needs for the vessel as a fishing vessel; (6) strengthening against ice beyond the requirements of Lloyd's or other Free World classification societies; (f) incorporating any Munitions List item or any of the following embargo items: 1210, 1430, 1435, 1485 (except the types specified in Interpretative Note 5) 1502, 1509, 1510.

New List                      Item 1416

Redefined to read: Vessels, the following: (a) fishing vessels and hulls therefor designed for speeds of 17 knots or over when in full load (design) condition; (b) seagoing vessels including coasters and hulls therefor n.e.s. designed for speeds of 20 knots or over when in full load (design) condition; (c) vessels with hulls and propulsion machinery made wholly or primarily of non-magnetic materials; (d) new ships with decks and platforms especially designed and strengthened to receive weapons; (e) vessels incorporating any Munitions List items, any of the following embargoed items: 1430, 1485, 1501, 1502 or arrangements for the demagnetization of the vessel.

Comment                      Item 1416

Note that the redefinition is a combination of former list items 1416 and 1417. Fishing vessels having speeds of less than 17 knots are not subject to control, as there are no fishing vessels in the world fleet with speeds of 17 knots that would qualify for embargo the present control is meaningless. The following is a recent tabulation of the world non-tanker fleet:

Number in fleet (1000 GPT upward)	12775
Number in fleet with speed 20 knots and over:	166

According to the present COCOM definition 98.7% of the present world fleet of non-tanker type vessels can now be exported to the Bloc. Vessels with speeds under 20 knots can also be constructed for export to the Bloc.

Former List                      Item 1417

Other vessels, as follows: (a) whale catchers; (b) ships designed to accommodate 200 or more passengers; (c) coasters,

of non-tanker type vessels can now be exported to the Bloc. Vessels with speeds under 20 knots can also be constructed for export to the Bloc.

Former List                      Item 1417

Other vessels, as follows: (a) whale catchers; (b) ships designed to accommodate 200 or more passengers; (c) coasters, i.e., sea-going cargo or passenger ships under 1000 gross registered tons; (d) ships with any of the following characteristics: (1) bow and/or stern unloading arrangements including doors, ramps, and train or car ferry layout; (2) special design or facilities to permit launching or landing of aircraft; (3) lifting gear over 50 tons capacity; (4) deck or hull strengthening for weapons or special construction to accommodate or carry military equipment on or under deck; (5) any arrangements for demagnetizing or the provision of non-magnet characteristics; (6) electrical generating capacity and/or fuel capacity in abnormal excess of the commercial needs of the vessel; (7) strengthening against ice beyond the requirements of Lloyd's or other Free World classification societies; (8) incorporating any Munitions List item or any of the following embargo items: 1210, 1430, 1435, 1485, (except the types specified in Interpretative Note No. 5) 1502, 1509, 1510.

New List                              Item 1417

Deleted, combined with item 1416.

Former List                              Item 1425

Batteries (submarine)

New List                              Item 1425

Deleted, transferred to Munitions List item 9(e).

Former List                              Item 1430

Cable, as follows: (a) electric conducting cable, suitable for sweeping magnetic mines or for harbor defense; (b) wire rope, strand and cord, made of phosphor bronze or stainless steel suitable for aircraft.

New List                              Item 1430

Redefined to read: Buoyant electric conducting cable suitable for sweeping magnetic mines.

SECRET

Comment Item 1430

If buoyant cable is not available to the Soviet bloc they can readily use non buoyant cable, not subject to embargo, by attaching buoyant rings.

Former List Item 1435

Minesweeping equipment (magnetic and acoustic)

New List Item 1435

Deleted, transferred to Munitions List item 4(b).

Former List Item 1441

Marine steam boilers having a capacity to generate 11 lbs. of steam per sq. ft. or more, of tubular heating surface per hour at pressures of 450 PSI or more, and feed water heaters for such boilers.

New List Item 1441

Redefined to read: Marine steam boilers designed to operate at temperatures of 1100° F. and above.

Comment Item 1441

The U.S. Navy does not have a marine boiler that meets the revised definition. The Navy does have two boilers designed to operate at temperatures lower than 1050° F.

Former List Item 1450

Automotive vehicles or chassis, including specially designed parts therefor, having both front and rear drives and possessing any of the following characteristics: (a) maximum approved load capacity in excess of 1200 lbs. and engine capacity in excess of 3000 cc; (b) water proofed for operation when engine submerged in water; (c) radio suppression including fully screened high tension leads.

New List Item 1450

Redefined to read: Automotive vehicles, tractors, lift trucks, n.e.s. possessing or built to current military specifications differing materially from their normal commercial specifications.

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Comment                      Item 1450

The revised definition appears to duplicate the coverage of Munitions List item 9.

Former List                      Item 1460

None, was included in the Munitions List.

New List                      Item 1460

New item: Aircraft, aero engines and aircraft equipment as follows: (a) aircraft and aero engines n.e.s., except those which: (1) are of types and series which have been in normal civil use for more than two years or (2) being of types and series in normal civil use, are under 90000 lbs. empty weight and (3) do not contain or incorporate any Munitions List items; (b) ground and airborne equipment (n.e.s.) developed solely or used mainly for aircraft, except ground or airfield equipment of types in normal civil use. (Note: 1. The condition at (3) applies to both the alternative at (1) and (2). 2. Empty weight is understood to include normal installation and normal minimum crew, but does not include fuel and payload.)

Comment                      Item 1460

All civil aircraft except the Boeing 707 and Douglas DC8 can now be exported to the Soviet bloc.

Former List                      Item 1471

Turbine locomotives, as follows: (a) general service (line) switching and industrial locomotives of a gauge greater than 4 ft. 8 inches or with an individual axle load greater than 12 metric tons; (b) parts specially designed for the above locomotives.

New List                      Item 1471

Deleted.

Comment                      Item 1471

Foreign Service Despatch 183, 24 November 1958, from Embassy Warsaw reports that substantial numbers of locomotives required for Poland's transportation expansion are intended to be purchased abroad.

Former List                      Item 1481

Centralized traffic control (CTC) system of railway signalling controlled by code impulses; and parts specially designed therefor.

New List                        Item 1481

Deleted.

Comment                        Item 1481

The report from Warsaw noted above stated, "Stress should be laid on the introduction of new techniques, thus along with electrification and dieselization, automatic block systems, remote control dispatching boards, automatic transfer devices and automatic stopping devices in trains should find application on our (Poland) railways."

Former List                      Item 1485

Compasses and gyroscopic equipment, as follows:  
(a) gyro compasses; (b) transmitting magnetic compasses;  
(c) gyro magnetic compasses; (d) repeaters for these compasses; (e) gyroscopic stabilizers; (f) gyroscopic steering controls.

New List                        Item 1485

Redefined to read: Compasses and gyroscopic equipment as follows: (a) gyro compasses, North seeking only, possessing one or more of the following characteristics: (1) automatic correction for the effects on compass accuracy of change in ship's speed, acceleration, or latitude. (Manually set mechanical corrective devices such as the speed course latitude corrector on the Sperry MK 14 MOD 1 compasses are specifically excepted.); (2) provision for accepting ship's data as an electrical input; (3) provision for setting in corrections for current set and drift; (4) utilization of accelerometer, rate gyro, rate integrating gyros, or electrolytic levels as sensing devices; (5) provision for determining and electrically transmitting ships level reference data (roll, pitch) in addition to own ship's course data; (b) pressure proof ships course indicators for submarines; (c) transmitting magnetic compasses specially designed for submarines; (d) gyro magnetic compasses; (e) gyro

stabilisers, except those for stabilising an entire surface vessel; (f) automatic pilots, except marine types for surface vessels; (g) gyroscopes of very high precision and miniaturised gyroscopes which are designed for use in ship inertia navigation systems or in the guidance system of weapons and military aircraft; (h) specially designed parts and components for the above.

SUMMARY RESULT OF REVIEW OF TRANSPORTATION  
EQUIPMENT CATEGORY

Original number of items	14
Items deleted	4
Items transferred to Munitions List	2
Items redefined	4
New items added	1

ELECTRONICS AND PRECISION INSTRUMENTS CATEGORY

Former List

Item 1501

Communication equipment specially designed for use in aircraft or for communicating with aircraft; and specialized parts therefor.

New List

Item 1501

Redefined to read: Communication, navigation, direction finding and radar equipment, n.e.s., as follows:

(a) airborne communication equipment and specialized parts and components therefor.

NOTE: Governments may permit as an administrative exception the shipment of commercial airborne equipment needed to equip Sino-Soviet Bloc aircraft which participate in scheduled commercial flights to Free World destinations, and containing none of the following characteristics: (1) designed to operate at frequencies greater than 156 Mc/s; (2) designed for single side band operation; (3) incorporating facilities for the rapid selection of more than 50 channels per equipment; (4) incorporating facilities for providing a multiplicity of alternative output carrier frequencies controlled by a lesser number of piezo electric crystals and not forming multiples of a common control frequency; (5) pressurized by any method; (6) rated for operation over a range of ambient temperatures extending from below - 45° C. to above / 75°C.

These shipments should be reported in monthly statistics.

(b) airborne navigation equipment and direction finding equipment, as follows: (1) designed to make use of "doppler" frequency phenomena; (2) utilizing the constant velocity and/or the rectilinear propagation characteristics of electromagnetic waves having frequency less than  $4 \times 10^{14}$  cycles per second (0.75 microns); Note: Governments may permit as an administrative exception the shipment of commercial airborne equipment needed to equip Sino-Soviet Bloc aircraft which participate in scheduled commercial flights to Free World destinations, and not designed to make use of hyperbolic grids based on the constant velocity and/or the rectilinear propagation characteristics of electromagnetic waves of frequencies greater than 3.0 megacycles per second. These shipments should be reported in monthly statistics; (3) pulse modulated altimeters; (4) direction finding equipment operating at frequencies greater than 5 Mc/s. (c) airborne radar

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equipment; (d) ground and marine radar equipment, as follows: (1) radar equipment n.e.s., other than those normal equipment designed for pulse operation at frequencies between 1300 Mc/s and 1660 Mc/s, 2700 Mc/s and 3900 Mc/s, or 8500 Mc/s and 10000 Mc/s, having in the case of marine radar, a peak output power to the aerial system less than 50 KW or, in the case of ground-based radar, having a peak output power to the aerial system less than 50 KW and a range less than 50 nautical miles. Note: The 50 nautical miles range is intended to refer to the maximum usable range on the largest size heavier-than-air target; (2) radar equipment incorporating permanent echo cancellation facilities and/or aeriels with circular polarization; (3) radar equipment utilizing other than conventional pulse modulation and signal processing techniques; (4) ground direction finding equipment operating at frequencies greater than 5 Mc/s; (e) ground and marine equipment for use with airborne navigation equipment utilizing the constant velocity and/or the rectilinear propagation characteristics of electromagnetic waves having frequency less than  $4 \times 10^{14}$  cycles per second (0.75 microns). Note: Governments may permit as administrative exceptions the shipment of ground equipment for use with airborne navigation equipment required for use at Sino-Soviet Bloc airports for servicing commercial flights from the Free World and not designed to make use of hyperbolic grids based on the constant velocity and/or the rectilinear propagation characteristics of electromagnetic waves of frequencies greater than 3 megacycles per second. These shipments should be reported in monthly statistics; (f) specialized parts, specialized accessories and specialized testing or calibrating equipment, n.e.s., for the apparatus listed in (b) to (e) above.

Comment

Item 1501

(a)(1) provides for the embargo only of equipment designed to operate at frequencies greater than 156 Mc/s. As present Soviet military and civil operational airborne equipment is in the 100-156 mc band, the control poses no obstacle to the Bloc obtaining material having for them a clear military application. Release of 2/36 mc/s band equipment involves items having advanced packaging techniques for airborne applications and channel selection facilities believed not now available in the Sino-Soviet military/commercial inventory.

(a) (3) provides for the embargo of units incorporating facilities for the rapid selection of more than 50 channels per equipment. With the exception of a Czech copy of British equipment having 26 channels, standard Soviet equipment has only 4 channels with frequent dual installations to meet requirements

SECRET

for greater capability. The release of equipment up to 50 channels provides the Bloc access to equipment and technology giving them a vastly improved traffic handling and air defense capability.

(b)(3) provides for the embargo only of the pulse modulated type altimeter; frequency modulated altimeters, the most modern type are not subject to embargo.

(b)(4) The frequency cutoff for direction finding equipment raised from 3 to 5 Mcs, was a move in the wrong direction as the more important items of equipment operate in a range under 3 Mcs. The definition permits the release of such equipment as Loran and Decca. The anticipated loss would include new packaging techniques and greater accuracy which we doubt the Soviet bloc now possess.

(b) The present definition for airborne navigation equipment and direction finding equipment does not fully cover Western capability, considered to be more advanced than that of the Bloc, and hence is not sufficiently restrictive. For example, the (b)(1) "Doppler" frequency phenomena is only one technical function which contributes to the accuracy of an airborne navigation system. The (b)(2) constant velocity and rectilinear propagation characteristics of electromagnetic waves does not clearly cover the phase comparison techniques used in cycle-matching navigation systems. In general, the definitions cover certain electromagnetic functions and not navigation systems/equipment as such leaving it up to non-technical licensing and enforcement authorities to interpret and associate equipment with highly technical definitions.

(d) Originally all radar was subject to embargo. An important loss under the present definition is the release of equipment in the 1300-1660 Mc band where the Soviets have not previously operated. This provides them with completely designed and tested components in this frequency range. The 50 KW peak power and 50 nautical mile limitation imposed by the new definition will require close competent enforcement surveillance to insure that the equipment released for shipment do not exceed these performance limitations. Likewise other limitations (d)(2) and (d)(3) will require equally close licensing and enforcement action due to the difficulty of technical identification.

SECRET

(d)(4) This definition covering ground direction finding equipment in which the frequency cutoff was raised from 3 to 5 Mcs is subject to the same comments made under (b)(4) above.

(e) The definition of this sub-item describes certain electro-magnetic functions with which ground marine equipment must be identified. (See comments under (b) above). The ground transmission systems of Loran, and similar trans-horizon navigation systems using frequencies below 3 Mcs, would be released by exercise of the administrative note. This equipment was originated by military requirements for an all weather aircraft capability and must still be considered highly strategic.

Former List                      Item 1502

Communication equipment of a kind using infra-red radiation or ultrasonic waves; and specialized parts therefor.

New List                        Item 1502

Redefined to read: Communication and detection equipment of a kind using infra-red radiation or ultrasonic waves; and specialized parts therefor.

Former List                      Item 1503

None.

New List                        Item 1503

New item: Communication equipment employing tropospheric, ionospheric or meteoric scatter phenomena and specially designed sub-assemblies parts and test equipment therefor..

Comment                        Item 1503

A new item developed to protect by means of embargo a modern military communication system. Since much of this system's equipment is commercial and covers a multitude of test equipment, sub-assemblies and related parts a problem of uniform identification, licensing and enforcement exists if an effective control is to result.

SECRET

Former List                      Item 1507

"Jamming" apparatus (i.e., apparatus specially designed to jam or otherwise interfere with radio reception); and specialized parts therefor.

New List                        Item 1507

Retained without change.

Comment                        Item 1507

The definition, "Jamming apparatus (i.e., apparatus specially designed to jam or otherwise interfere with radio reception); and specialized parts therefor," was retained without change. The term "Jamming" is not adequate to describe all electronic countermeasure equipment. In addition to a capability to "otherwise interfere with radio reception" a requirement exists to cover those electronic-countermeasurers, both radio and radar, and including jamming, deception, and confusion devices designed to enhance the penetration survival of a military vehicle.

Former List                      Item 1509

Location apparatus as follows:

(a) apparatus of a kind used for detecting objects or for determining the relative direction, position, or motion of objects by means of the constant velocity or rectilinear propagation characteristics of electro-magnetic waves having frequencies less than  $4 \times 10^{14}$  cycles per second (0.75 microns) (except radio direction finding equipment of a kind used at frequencies not greater than 3 megacycles per second); (b) specialized parts and accessories of such apparatus; (c) specialized equipment for testing or calibrating such apparatus.

New List                        Item 1509

Deleted. This item definition was combined with item 1501.

Former List                      Item 1510

Location apparatus, under-water: apparatus for detecting or locating objects under water by magnetic or acoustic or ultrasonic methods (except marine depth sounders of a kind used solely for measuring the depth of water or the distance of submerged objects vertically below the apparatus); and specialized component of such apparatus.



New List

Item 1510

Redefined to read: Location apparatus, underwater: apparatus for detecting or locating objects under water by magnetic or acoustic or ultrasonic methods, and specialized components of such apparatus, except: (1) marine depth sounder of a kind used solely for measuring the depth of water or the distance of submerged objects vertically below the apparatus; (2) specific types of horizontally operated fish and/or whale finding equipment.

Comment

Item 1510

The present reworded definition allows for increased exception to embargo for "specific types of horizontally operated fish finding equipment." Identification was made of four specific name brand types considered to have a non-military capability. These are now exempt from control.

Former List

Item 1514

Pulse modulators capable of providing electric impulses of peak power exceeding 10 KW; and pulse-transformers and pulse-forming equipment being specialized parts of such modulators.

New List

Item 1514

Redefined to read: Pulse modulators capable of providing electric impulses of peak power exceeding 150 KW or of a duration of less than 1/10th microsecond; and pulse-transformer and pulse-forming equipment, and delay lines being specialized parts of such modulators.

Comment

Item 1514

As redefined the power cutoff was increased from 10 KW to 150 KW. Some of our latest developmental airborne modulators employing low power-long pulse techniques, together with matched filters are now uncontrolled. The item is also being applied to ground based early warning radar equipment. This loss could provide the Soviets with an improved long range - high resolution radar capability with low power input.

SECRET

Former List                      Item 1516

Radio receivers, panoramic (being receivers which search automatically a part of the radio-frequency spectrum and indicate visibly the signals received); and specialized parts therefor.

New List                        Item 1516

Redefined to read: Radio receivers, panoramic (being receivers which search automatically a part of the radio-frequency spectrum and indicate the signals received); and specialized parts therefor.

Comment                        Item 1516

The removal of the word "Visible" from the old definition allows for the control of units having film recording, magnetic tape recording and other similar storage capability. This is an improved coverage over an item for which there is a very limited requirement.

Former List                      Item 1517

Radio transmitters and components as follows:

- (a) transmitters or transmitter amplifiers designed to operate:
  - (1) at output carrier frequency between 108 and 156 mc/s, and/or
  - (2) with output carrier frequency above 216 mc/s
- (b) transmitters, or transmitter amplifiers, designed to operate with output carrier frequency higher than 30 mc/s and designed to provide any of the following features:
  - (1) any system of pulse modulation other than amplitude-modulated television, frequency-modulated television, or pulse modulated television;
  - (2) two or more independent modulation channels on one radio frequency carrier;
  - (3) simultaneous output at more than one radio frequency carrier frequency;
  - (4) special facilities to give continuous operation (on any carrier frequency outside the internationally agreed broadcasting bands) in interconnection with land-line telephone circuits or switchboards, e.g. voice-operated gain-adjusting circuits, automatic volume compression and expansion circuits, and automatic monitoring;

- (5) rapid selection, by means of preadjusted tuning controls, between four or more radio frequency carrier frequencies in equipment designed for operation in commercial moving vehicles; or between two or more radio frequency carrier frequencies in equipment not so designed;
  - (6) modulation bandwidth greater than 4 kilocycles at any carrier frequency within any of the bands 30 to 41 mc/s, 68 to 87.5 mc/s, 100 to 108 mc/s;
  - (7) carrier output power, for static and trans-portable sets, greater than 100 watts, and for mobile sets greater than 25 watts, at any carrier frequency within any of the bands 30 to 41 mc/s, 68 to 87.5 mc/s, 100 to 108 mc/s;
  - (8) special facilities for uses other than sound or vision broadcasting, mobile communications, fixed headquarters station for mobile services, or a mobile sound or vision link to main broadcast station;
  - (c) mobile communications equipment operating at carrier frequencies above 30 mc/s, or headquarter stations therefor, other than those types designed for and already in use in Western countries for normal commercial civilian purposes;
  - (d) transmitters, or transmitter drive oscillators, designed to provide a multiplicity of alternative output carrier frequencies controlled by a lesser number of piezo-electric crystals.
- (Note: This covers equipment working below 30 mc/s as well as above. Sets incorporating crystal-economizing circuits are mainly required for military purposes (e.g. airborne and tank communications). The output frequency of the drive oscillator is not necessarily the same as that of the complete transmitter, but is often a sub-multiple of it, which is the reason for omitting a lower frequency limit.)
- (e) components and sub-assemblies, including modulators and modulation amplifiers, specially designed for use in transmitters covered by sub-items (a), (b), (c) or (d) above.

New List

Item 1517

Redefined to read: Radio transmitters and components, n.e.s., except radio link and relay equipment as follows: (a) transmitters or transmitter amplifiers designed to operate: (1) at output carrier frequencies between 108 and 156 Mc/s; (Note: Governments may permit as an administrative exception the shipment of equipment required for use at Sino-Soviet Bloc airports for servicing commercial flights from the Free World and containing none of the characteristics mentioned under sub-item (b). These shipments should be reported in monthly statistics; (2) at output carrier frequencies greater than 223 Mc/s other than television broadcasting transmitters and amplifiers therefor operating between 470 and 585 Mc/s or between 610 and 940 Mc/s; (b) transmitters or transmitter amplifiers designed to provide any of the following features: (1) Any system of pulse modulation. (This does not include amplitude, frequency or phase modulated television.) (2) Special facilities to give continuous operation (on any carrier frequency outside the internationally agreed broadcasting bands) in interconnection with land-line telephone circuits or switchboards, e.g. voice-operated gain-adjusting circuits, automatic volume compression and expansion circuits, and automatic monitoring; (3) Rapid selection of more than 20 channels; (4) Rated for operation over a range of ambient temperatures extending from below -45° C. to above 75° C.; (5) Facilities providing a multiplicity of alternative output carrier frequencies controlled by a lesser number of piezo-electric crystals and not forming multiples of a common control frequency; (c) Components and sub-assemblies, including modulators and modulation amplifiers, specially designed for use in transmitters covered by sub-item (a) and (b).

Comment

Item 1517

The revised definition reflects a technical improvement, however, there is some duplication with other items for example, 1501 (b)(e) and 1517 all embargo ILS glide slopes, operating at 330 Mc/s. The revision allows export of VHF and UHF TV transmitters. It should be noted that the Soviets are not presently operating in the UHF band, therefore this provides them with completely designed and tested equipment should they desire to extend their operation to this band. TV transmitters, both VHF and UHF type transmitters are of considerable power and could be used for jamming the newly developed military ionosphere/troposphere communications system. The administrative

31a

SECRET

note added to the new definition allows export of transmitters capable of working with aircraft in limited numbers. This note permits the release of refined late model localizer transmitters for instrument landing systems. This equipment incorporates significant new design techniques.

Former List                      Item 1518

Telecontrol equipment suitable for controlling pilotless aircraft and guided weapons.

New List                        Item 134

Revised to read: Telemetering and telecontrol equipment suitable for use with aircraft (piloted or pilotless) and weapons (guided or unguided).

Comment                        Item 1518

The new definition was expanded by the addition of telemetering equipment. This item is considered to be covered by the Munitions List and therefore represents a duplicate coverage.

Former List                      Item 1519

Telegraph equipment, as follows:

- (a) equipment (machines, mechanical, electro-mechanical, or electronic, used to translate the information contained in written or printed text into electrical waveforms suitable for transmission over communication circuits at any speed greater than 200 words per minute or 150 bands, whichever is the less;
- (b) equipment designed to accept such electrical waveforms and display the information from them in visible form;
- (c) specialized component parts and accessories for such equipment.

New List                        Item 1519

Revised to read: Telegraph equipment, as follows:

- (a) Equipment (machines), mechanical, electro-mechanical, or electronic, used to translate the information contained in written or printed text into electrical waveforms suitable for transmission over communication circuits at any speed greater than 200 words per minute or 150 bands, whichever is the

less; except equipment operating at a speed of 300 bands where the corresponding number of words does not exceed 65 words per minute; (b) Equipment designed to accept such electrical waveforms and display the information from them in visible form; (c) Specialized component parts and accessories for such equipment.

Former List                      Item 1520

Radio relay communications equipment and specialized components and subassemblies therefor.

New List                        Item 1520

Revised to read: Radio relay communications equipment and specialized components and sub-assemblies therefor. other than short-range and low power links for transmissions between the camera or studio and the television transmitter. Note: shipments of short-range and low-power links excluded from this definition should be reported to the Committee promptly.

Comment                        Item 1520

The definition covering radio relay communications equipment was modified releasing short range low powered TV transmission links. This loss was considered insignificant by the technicians.

Former List                      Item 1521

Amplifiers, as follows: (a) designed to operate at frequencies in excess of 100 Mc/s; (b) tuned amplifiers having a bandwidth (defined as the band of frequencies over which the power amplification does not drop to less than one-half of its maximum value) which exceeds 5 mc/s or 10% of the mean frequency, whichever is less. (The mean frequency is defined as the arithmetic mean between the frequencies at which the power amplification is one-half of its maximum value); (c) untuned amplifiers having a bandwidth, as defined in sub-item (b) above, which exceeds 5 mc/s per second; (d) DC amplifiers having a noise level (referred to the input circuit) of 10-16 watts or less and/or a zero drift of 1 hour corresponding to a change in input power of 10-16 watts or less; (e) capable of a total power output in excess of 500 watts at any frequency or frequency between 15 K/cs per second and 200 K/cs per second.

## New List

## Item 1521

Revised to read: Amplifiers, n.e.s., as follows:

(a) Designed to operate at frequencies in excess of 300 Mc/s; (b) Tuned amplifiers having a bandwidth (defined as the band of frequencies over which the power of amplification does not drop to less than one-half of its maximum value) which exceeds 10 Mc/s or 10 percent of the mean frequency, whichever is less. (The mean frequency is defined as the arithmetic mean between the frequency at which the power amplification is one-half of its maximum value); (c) Untuned amplifiers having a bandwidth, as defined in sub-item (b) above, which exceeds 10 Mc/s; (d) D.C. amplifiers having a noise level (referred to the input circuit) of 10-16 watts or less and/or a zero drift in 1 hour corresponding to a change in input power of 10-16 watts or less.

## Comment

## Item 1521

- 1521(a) Raises frequency limit from 100 mc/s to 300 mc/s.
- 1521(b) Raises bandwidth from 5 mc/s or 10% to 10 mc/s or 10% whichever is greater (for tuned amplifiers).
- 1521(c) Raises bandwidth from 5 mc/s to 10 mc/s (same as (d) above, but for untuned amplifiers).
- 1521(d) No change.
- 1521(e) Old definition embargoed amplifiers having outputs above 500 watts in the frequency range of 15 kc/s to 200 kc. New definition imposes no restrictions on power output.

This item is one of a group of basic communications components which constitutes a major Bloc deficiency in the field of electronics. As the original definition provided for the release of TV amplifiers, the further relaxation must be viewed as a loss of some significance as it releases amplifiers used in low frequency radar (missile detection) P-band (225-400 mc/s) and VHF (100-300 mc/s) communications and navigation equipment.

## Former List

## Item 1523

Line communications transmission equipment as follows:

(a) terminal and intermediate repeater or amplifier equipment designed to deliver, carry or receive frequencies higher than 10 Kcs into, or in a line communication system; (b) multi-channel telegraph terminal transmitting and receiving equipment; (c) specialized components, accessories and sub-assemblies for the above equipment.

New List

Item 1523

Revised to read: Line communication transmission equipment as follows: (a) Terminal and intermediate repeater or amplifier equipment designed to deliver, carry, or receive frequencies higher than 16 Kc/s into, or in, a line communication system; (b) multi-channel telegraph terminal transmitting and receiving equipment; (c) Specialized components, accessories, and sub-assemblies for the above equipment.

Note: In cases where it can be shown satisfactorily that the equipment is to be installed in circuits directly connecting densely populated industrial areas of Sino-Soviet Bloc countries with Free World communication systems, Governments may license specific shipments of line communication transmission equipment having the following characteristics: (1) terminal and intermediate repeater or amplifier equipment designed to deliver, carry, or receive not more than 60 voice channels of 4 kc/s each; (2) multi-channel telegraph terminal transmitting or receiving equipment transmitting or receiving not more than 6 channels and/or designed for speeds not exceeding those defined in item 1519. Such licenses should be reported immediately to the Committee with details and full justification.

Comment

Item 1523

To be developed.

Former List

Item 1524

Communications submarine cable of all types.

New List

Item 1524

Deleted. See items 1525 and 1526.

Former List

Item 1525

Coaxial type cables, single or multi-tube, as follows: (a) having an attenuation not exceeding 10 decibels per 100 feet and a standing wave ratio of 2 or less, when terminated in their characteristic impedance at 3000 megacycles; (b) all airspace types; (c) all types with polytetrafluoroethylene or polytrifluorochloroethylene dielectric.



New List

Item 1525

Redefined to read: Coaxial-type cables (including submarine cables) specially designed for telecommunication purposes (including radar) other than those specially designed or in common use for domestic radio and television receivers.

Comment

Item 1525

Since specific performance parameters have been eliminated in the revised definition the exception from control, cable, "specially designed or in common use for domestic radio and television receivers" provides a significant loophole in the embargo control.

Former List

Item 1526

Communications cable of any type containing more than one pair of conductors and containing any conductor (single or stranded) exceeding 0.9 MM in diameter. Note: In view of the recent technological developments in this field, member Governments agree not to export to the Soviet Bloc cables containing more than one pair of conductors of 0.9 MM or less in diameter when the exporting Government considers that these are manufactured as long distance communications carrier-frequency cables.

New List

Item 1526

Redefined to read: Communication cable (including submarine cables) of any type containing more than one pair of conductors and containing any conductor, single or stranded, exceeding 0.9 MM in diameter. (Note: 1. In view of the recent technological developments in this field, member Governments agree not to export to the Sino-Soviet Bloc cables containing more than one pair of conductors of 0.9 MM or less in diameter when the exporting Government considers that these are manufactured as long distance communication carrier-frequency cables.

- (New) 2. In cases where it can be shown satisfactorily that the equipment is to be installed in circuits directly connecting densely populated industrial areas of Sino-Soviet Bloc countries with Free World communication systems, Governments may license specific shipments of cable neither containing more than two pairs of conductors nor containing any conductor, single or stranded, exceeding 1.4 MM in diameter. Such licenses should be reported immediately to the Committee with details and full justification.

Comment

Item 1526

Being developed.

Former List                      Item 1527

None

New List                        Item 1527

New item: Equipment designed to provide secrecy facilities on either voice of telegraph, line or radio communication circuits other than those systems making use of frequency inversions or band scrambling techniques.

Comment                        Item 1527

"Equipment designed to provide secrecy facilities on either voice or telegraph, line or radio communication circuits other than those systems making use of frequency inversions or band scrambling techniques." The lack of documentation in support of the addition of this item by the U. K. presents a number of problems. Equipment covered by the embargo is generally under strict security control and would be difficult to identify for licensing purposes if ever a trade possibility exist. The equipment released has lost its military security value as means have been developed to penetrate the system. Certainly little can be claimed for the addition of this new item, other than to except certain items from embargo control.

Former List                      Item 1529

Measuring instruments, as follows:

(a) electrical instruments, as follows:

- (1) apparatus for measuring impedance, admittance, capacitance or inductance at frequencies in excess of 100 megacycles per second;
- (2) variable attenuators giving readings, accurate to less than plus or minus 5 per cent of the indicated value expressed in decibels, at frequencies of 1 megacycle per second or above;
- (3) equipment for measuring permittivity, and/or power factor of dielectrics at frequencies of 1 megacycle per second or above;
- (4) radio-frequency field strength measuring equipment;
- (5) frequency measuring equipment with an accuracy better than plus or minue 0.01 per cent at frequencies over 99 kilocycles per second;
- (6) electronic stabilized power supplies delivering a DC output voltage which:
  - (1) varies by less than 1 per cent of any input voltage variation within plus or minue 20 per cent of the nominal, and/or

SECRET

- (11) varies by less than 0.1 per cent of the maximum rated voltage between no load and maximum rated load;
- (7) those operating at frequencies exceeding 300 megacycles per second;
  - (b) resistors, inductors, or capacitors, fixed or variable, with a rated accuracy better than plus or minus 1 per cent at 1 megacycle per second or any higher frequency;
  - (c) apparatus for automatically sorting electronic components in respect of their electrical characteristics.

New List

Item 1529

Redefined to read:

Electronic instruments, as follows:

- (a) Those operating at frequencies in excess of 300 Mc/s, except radio spectrum analysers. (See Item 1533.)
- (b) Frequency measuring equipment and frequency standards with an accuracy better than 0.00001%.

Comment

Item 1529

Loss in the present definition is in frequency coverage and frequency stability limits. The Soviets appear capable of manufacturing acceptable instruments for frequencies up to the 300 mc limit exempt from control although certain Western hardware in this band may be somewhat more flexible and accurate than that produced in the Soviet Union. Frequency stability specified would allow all but the very best quartz oscillators to be exported. It should be kept in mind that several new weapon systems require very stable frequency sources to function properly.

Former List

Item 1530

See Former List Item 1529, subitem (c).

New List

Item 1530

Apparatus for automatically sorting electronic components in respect of their electrical characteristics.

Comment

Item 1530

While listed as a new numbered item, this product was originally a subitem under item 1529. It can be also considered by Item 1355, subitem (b)

SECRET

Former List

Item 1533

Radio spectrum analyzers (being apparatus capable of indicating the single-frequency components of multi-frequency oscillations); and specialized parts of such analyzers.

New List

Item 1533

Redefined to read: Radio spectrum analysers (being apparatus capable of indicating the single-frequency components of multi-frequency oscillations) designed to operate at frequencies in excess of 300 megacycles per second; and specialised parts of such analysers.

Comment

Item 1533

Radio spectrum analyzers are used principally in connection with military radar and countermeasure apparatus. It is believed that the U. S. has developed spectrum analyzers and techniques which surpass Russia. Originally all analyzers were embargoed. The revised definition however released analyzers operating below 300 Mcs. In effect this change continues to embargo those used in connection with radar but released those associated with communications (military communications countermeasures and reconnaissance). The bulk of military requirements for this equipment fall within the released area.

Former List

Item 1537

Special tuned circuits, as follows:

- (a) electromagnetic waveguides, resonant circuits, and radiators of a kind used at frequencies exceeding 600 megacycles per second.
- (b) articles or equipment incorporating, or designed to be connected to or to be incorporated in, any such waveguide, circuit, or radiator.

New List

Item 1537

Redefined to read:

Electromagnetic waveguides and components therefor, as follows:

- (a) Ferrite waveguide components for use at all frequencies;
- (b) Rigid waveguides for use at frequencies in excess of 12,500 Mc/s;
- (c) Flexible waveguides of all types.

SECRET

Comment

Item 1537

The original definition was very broad and could be interpreted to include the transmitter output tubes, pressurizing equipment, frequency and power measuring equipment antennas, wave guides, etc. of a kind used at frequencies exceeding 600 mcs. The present definition excludes all accessory items except ferrite components for use at all frequencies. Flexible wave guides of all types were retained as well as rigid wave guides for use at frequencies in excess of 12500 mcs. High-power broad band rotating joints as well as over-all equipment where resonant circuits, resonators, etc. would be used are no longer subject to control.

Former List

Item 1541

Cathode-ray tubes, as follows:

- (a) with screen afterglow longer than 1/2 second;
- (b) with writing speeds of more than 3,000 kilometers per second;
- (c) with 2 or more electron guns.

New List

Item 1541

Redefined to read:

Cathode-ray tubes, as follows:

- (a) Specially designed or in use for radar equipment covered by Item 1501;
- (b) With writing speeds of more than 3,000 kilometers per second;
- (c) With 3 or more electron guns.

Comment

Item 1541

The present embargo definition fails to prevent the release of latest developed long persistence, high resolution cathode-ray tubes. Since few cathode-ray tubes are specifically applied to the systems excluded by item 1501 or are of the 3 or more electron gun type, the bulk of cathode-ray tube requirements as originally embargoed have now been released.

Former List

Item 1544

Crystal diodes specially designed for use at frequencies of 250 or more megacycles per second; and specialized parts therefor.

New List

Item 1544

Redefined to read:

Crystal signal diodes, excluding photodiodes (see Item 1548(b)), as follows:

- (a) Point contact type diodes suitable for use at frequencies higher than 300 Mc/s.
- (b) Junction type diodes in which the basic semiconductor material is other than germanium.
- (c) Junction type diodes in which the basic semiconductor material is germanium and that are suitable for use at frequencies higher than 50 Mc/s.
- (d) Specialised parts for the above.

Comment

Item 1544

It appears that the present coverage is somewhat greater than that provided by the original definition, for example, a cut-off limit of 50 mcs is now placed on function type germanium diodes compared with the original 250 mcs cut-off. While there was an increase of 50 mcs in another instance technicians are agreed this was an insignificant item. The impact of embargo of this product is not considered effective i.e., there is no evidence that Sino-Soviet production is deficient in either quality or quantity.

Former List

Item 1545

Transistors, with any number of electrodes, regardless of operating characteristics; and specialized parts therefor.

Note: A transistor is an electronic device incorporating a semi-conducting material, in which the current flowing between two electrodes is controlled by the voltage or current at another electrode. This item is intended to cover all devices incorporating a semi-conducting crystal of any material with three or more electrodes, which are used as amplifiers, oscillators, trigger devices, etc. in electronic circuits.

New List

Item 1545

Redefined to read:

Transistors and related devices (or related semi-conductor amplifying devices such as fieldistors, spacistors and technetrons) and specialised parts therefor, the following:

- (a) Of any type using a basic semi-conductor material other than Germanium;
- (b) Having any of the following characteristics:
  - (1) Designed to be capable of operation at alpha cut-off frequencies greater than 20 megacycles per second;
  - (2) Designed to have a collector dissipation in excess of 100 milliwatts at alpha cut-off frequencies greater than 500 kilocycles per second;
  - (3) Designed to operate with collector voltages greater than 40 volts;
  - (4) Designed to operate with mean collector currents greater than 3 amperes.

(NOTE: A transistor is an electronic device incorporating a semi-conducting material, in which the current flowing between two electrodes is controlled by the voltage or current at another electrode. Subject to the above definition, this item is intended to cover all devices incorporating a semi-conducting crystal of any material with three or more electrodes, which are used as amplifiers, oscillators, trigger devices, etc. in electronic circuits. For phototransistors see Item 1548.)

Comment

Item 1545

While the present definition was developed to allow the export of low power, low temperature, low frequency germanium transistors for civilian purposes, it should be noted these transistors are also suitable for new military communications and control equipment for which the Bloc is considered to be critically deficient. Furthermore the Bloc is considered to be from 3 to 5 years behind the West in the development and production of transistors. It appears the negotiators placed more emphasis on the U. S. use pattern rather than that of the Soviets when comparing this item with the governing COCOM criteria. It is doubtful there exists any comparability between the Bloc civilian - ~~military~~ use of deleted transistors with that of the U. S., therefore it is contended the deleted transistors qualify for embargo.

The highly qualified definition characteristics provide for difficult technical identification and enforcement, e.g.,

- "(b) Having any of the following characteristics:
  - (1) Designed to be capable of operation at alpha cut-off frequencies greater than 20 Mcs;



- (2) Designed to have a collector dissipation in excess of 100 milliwatts at alpha cut-off frequencies greater than 500 Kcs;
- (3) Designed to operate with collector voltages greater than 40 volts;
- (4) Designed to operate with mean collector currents greater than 3 amperes."

It is reported that Bloc countries have engaged in a considerable amount of illegal trade activity in transistors of Western manufactures.

Former List

Item 1548

Photoelectric cells, as follows:

- (a) photoelectric cells with a peak sensitivity at a wave length longer than 12,000 Angstrom units;
- (b) phototransistors (photo-conductive cells) with a response time constant of one millisecond or less measured at the temperature at which the time constant is minimum.

(Note: The time constant is defined as the time taken from the application of a light stimulus for the current increment to reach a value of 1-1/3 times the final value, i.e., 63% of the final value.

New List

Item 1548

Redefined to read:

Photo cells, as follows:

- (a) Photoelectric cells, photo-conductive cells including photo-transistors and similar cells) with a peak sensitivity at a wave length longer than 12,000 Angstrom;
- (b) Photo-transistors (photo-conductive cells including photodiodes) with a response time constant of 1 milli-second or less measured at the operating temperature of the cell for which the time constant reaches a minimum.

(NOTE: The time constant is defined as the time taken from the application of a light stimulus for the current increment to reach a value of 1-1/e times the final value (i.e., 63 per cent of the final value).)

Comment

Item 1548

Being developed.

Former List                      Item 1549

Photomultiplier tubes; and specialized parts therefor.

New List                        Item 1549

Redefined to read:

Photomultiplier tubes:

- (a) Photomultiplier tubes with all the following characteristics for a colour temperature of 2,350°K:
  - (1) Sensitivity exceeding the figure of 60 A/L;
  - (2) Overall gain for a mean output current of 1mA exceeding  $10^8$ ;
  - (3) Dark current plus noise less than  $5 \times 10^{-16}$  A mean per  $\text{cm}^2$  of active cathode surface;
- (b) Photomultiplier tubes of all types for which the maximum sensitivity occurs at wavelengths longer than 7,500 A.U.

Comment                        Item 1549

The original definition provided for the embargo of all photomultiplier tubes. This was replaced by a highly complex technical definition allowing for the export of a number of tubes. It is intended that high-sensitivity, high-grain tubes and tubes sensitive to infra-red radiation should remain under embargo. While those released are used in many industrial processes they also have military applications. The known characteristics of Soviet photomultiplier tubes are inferior to those produced in the West.

Former List                      Item 1553

X-ray tubes (flash discharge type).

New List                        Item 1553

Flash-discharge type X-ray tubes.

Comment                        Item 1553

Being developed. Embargo of this item may only require the USSR to continue to use satisfactory if not optimum substitutes thus effectively frustrating the control.

Former List Item 1555

Image converters and electronic storage tubes of all kinds, (excluding commercial standard television broadcasting camera tubes and commercial standard X-ray amplifier tubes), but including vidicon tubes.

New List Item 1555

Redefined to read:

Image converters and electronic storage tubes including memory transformers of radar pictures and ruggedised vidicon-type tubes (excluding commercial standard television broadcasting camera tubes and commercial standard X-ray amplifier tubes).

Comment Item 1555

The vidicon tube was originally a commercial TV tube which has been adopted by the military and in its "ruggedized" form is being used extensively in military applications. The ruggedized form is still subject to embargo but admittedly will be difficult to enforce due to a lack of clear uniform specifications covering a uniform understanding of "ruggedized."

Former List Item 1558

Valves (tubes) electronic, and specialized parts, as follows:

- (a) valves whose output-input ratio at 300 megacycles per second is 50 per cent or more of the output-input ratio at 20 megacycles per second when measured under the same operating voltages and load impedance,
- (b) those of a kind specially designed for use at frequencies of more than 250 megacycles per second;
- (c) indirectly heated valves of a kind that can be passed through a circular hole 1/2" in diameter;
- (d) those designed to withstand acceleration greater than 450g (g-acceleration under gravity, i.e., 984 cm/sec/sec).

New List Item 1558

Redefined to read:

Valves (tubes) electronic, and specialised parts as follows:

- (a) Valves whose output-input ratio at 300 megacycles per second is 50 per cent or more of the output-input ratio at 20 megacycles per second when measured under the same operating voltages and load impedance,

- (b) Those of a kind specially designed for use at frequencies of more than 300 megacycles per second;
- (c) Indirectly heated valves of a kind that can be passed through a circular hole 7.2 mm. in diameter;
- (d) (1) Those designed to withstand sinusoidal vibration of greater than 2 g for continuous periods in excess of 20 hours at frequencies between 25 and 170 cycles per second;
- (2) Those designed to withstand acceleration of short duration (shock) greater than 1,000g;
- (e) Valves constructed with ceramic envelope;
- (f) Valves designed for operation in ambient temperatures exceeding 100°C;
- (g) Amplifier Klystrons;
- (h) Travelling wave tubes.

Comment

Item 1558

Primary loss under the new definition is in the miniaturization and ruggedization area. Sub-item (c) allows the export of many subminiature tubes previously embargoed. Although the Soviets are now manufacturing sub-miniature tubes, available information indicates that far fewer types are available in comparison to those available in the West. The decontrol will do much to relieve this deficiency. Sub-item (d) allows for embargo of tubes specially designed to meet a specific ruggedness test. As tubes are not specially designed to meet such test requirements, little if any control can be expected in this instance. The Soviets have made some progress in producing a line of ruggedized tubes but here again the variety available is less than that in the West so the decontrol will provide substantial relief. Four new sub-items were added to the definition assuring embargo control of ceramic tubes, tubes designed for operating at elevated temperatures, klystron and traveling wave tubes.

New List                      Item 1560

Electronic components designed for and/or capable of reliable performance in relation to their electrical and mechanical characteristics and maintaining their design service lifetime while operating:

- (a) Over the whole range of ambient temperatures extending from below minus 45°C. to above plus 100°C.; or
- (b) At ambient temperatures of 200°C. or higher.

Comments                      Item 1560

Electronic components designed for and/or capable of reliable performance in relation to their electrical and mechanical characteristics and maintaining their design service lifetime while operating:

- (a) Over the whole range of ambient temperatures extending from below 45°C. to above plus 100°C.; or
- (b) At ambient temperatures of 200°C. or higher.

It will be necessary to now prepare a listing by trade name and/or identification marking of such electronic components meeting the characteristics of the definition if effective control is to result from the item addition.

Former List                      Item 1561

None.

New List                      Item 1561

Materials designed and manufactured for use as absorbers of electromagnetic waves having frequencies greater than  $2 \times 10^8$  cycles per second, and less than  $3 \times 10^{12}$  cycles per second.

Comment                      Item 1561

Materials designed and manufactured for use as absorbers of electromagnetic waves having frequencies greater than  $2 \times 10^8$  cycles per seconds, and less than  $3 \times 10^{12}$  cycles per second. Both the Soviets and Western countries have research programs for the development of materials that will meet the definition specification. Success could render radars nearly useless against aircraft, missiles, etc. Success would be of extreme value to the country making the breakthrough and would therefore be closely guarded. Certainly the nature of the materials

## Former List

Item 1559

Thyratron and ignitron tubes as follows:

- (a) those rated for continuous operation with peak current and peak voltage exceeding 100 amperes and 9000 volts at a pulse repetition frequency of 200 or more pulses per second;
- (b) hydrogen thyratrons of any rating.

(Note: The following are definitions of "thyatron" and "ignitron":

Thyatron - any hot cathode gas-filled tube containing three or more electrodes, in which anode current flow is initiated by a control electrode;

Ignitron - any mercury pool (cold cathode) tube with three or more electrodes, in which discharge is initiated by an igniter electrode.)

## New List

Item 1559

Redefined to read: Thyatron and modulator gas-discharge tubes, as follows:

- (a) Those rated for continuous operation with peak current and peak voltage exceeding 100 amperes and 9,000 volts at a pulse repetition frequency of 200 or more pulses per second;
- (b) Hydrogen thyratrons of any rating.

Note: The following is the definition of "thyatron":

Thyatron: any hot cathode gas-filled tube containing 3 or more electrodes in which anode current flow is initiated by a control electrode.)

## Comment

Item 1559

The present definition deletes the special type ignitron tube which in the Sino-Soviet bloc are used almost entirely in military radar sets. Primary use in the West is in industrial control circuits, e.g., power control systems of electric generating and distribution. It was on the basis of Western use that the item was deleted.

## Former List

Item 1560

None. (See item 1558-1501).

would not be disclosed in a trade control listing and until materials can be identified there can be no effective control. This item would properly qualify for the Munitions List.

Former List                      Item 1562

None.

New List                        Item 1562

Tantalum electrolytic capacitors, n.e.s.

Comment                        Item 1562

Tantalum capacitors are considered to have desirable features such as small size for high capacity required for miniaturized circuits. There is no evidence of Soviet capability in this area. The n.e.s. addition to the definition assumes that these capacitors may be considered covered by the technical functions/characteristics of other item definitions.

Former List                      Item 1563

Balances, electronic, capable of detecting differences in weight smaller than 10 micrograms; and specialized parts therefor.

New List                        Item 1563

Deleted.

Former List                      Item 1565

Computers, electronic (except business-type calculating machines).

New List                        Item 1565

Redefined to read: Computers, electronic (except business-type machines, accounting machines and statistical calculating machines).

Comment                        Item 1565

While the above definitions reflects a general understanding, it appears that further negotiations will be required to specifically identify exempted products by type and model if effective uniform

SECRET

control is to result. For example, the IBM 704 and Univac 1103A while advertised as business machines are used predominantly in U.S. military logistics systems. Until means are devised to separate commercial business and military business there will remain a doubt that the control is properly applied. The (US) "fact sheet" states that the definition "covers all types of electronic computers," analog and digital. It is recognized that some computers are specifically identified in the Munitions List and others would be caught by item 1501 (f), therefore the item appears to be more than well covered when the exempted types are multilaterally identified.

Former List                      Item 1566

Equipment specially designed to produce electronic assemblies:

- (a) by depositing or printing on insulating panels including plates and wafers), or otherwise forming in situ, component parts other than basic wiring; or
- (b) by automatically inserting and/or soldering components on insulating panels (including plates and wafers), to which wiring is applied by printing or other means.

New List                              Item 1566

Retained without change.

Former List                              Item 1568

Control equipment the following:

- (a) synchros, as follows:
  - (1) control types (transmitters, differential transmitters, and transformers) rated to have an electrical error of 18 minutes or less when tested by the proportional voltage method;
  - (2) torque types;
    - (i) Transmitters and differential transmitters rated to have an electrical error of 18 minutes or less when tested by the proportional voltage method;
    - (ii) Receivers and differential receivers rated to have an accuracy of 1.5 degrees or less when tested by the dynamic method;
  - (3) special instruments rated to have the same characteristics as synchros in (1) and (2) above, such as Microsyns and Synchro-Tels;

SECRET



- (b) resolvers, including single-phase/single-phase, single-phase/two-phase, two phase/two-phase, and three-phase/two-phase types as follows:
  - (1) with a rated electrical error of 0.5 degrees or less;
  - (2) with a rated perpendicularity error between axes of 10 minutes or less;
  - (3) with a rated null voltage of 10 millivolts or less per maximum volt output;
- (c) amplifiers, electronic or magnetic, designed for use with resolvers, the following:
  - (1) isolation types;
  - (2) summing types;
- (d) linear induction potentiometers, as follows:
  - (1) with a rated linearity of 1 percent or less;
  - (2) with a rated null voltage of 10 millivolts or less per maximum volt output;
- (e) induction rate generators, as follows:
  - (1) with a rated linearity of 1 percent or less;
  - (2) with a rated signal-to-noise ratio of 50/1 or greater;
  - (3) all temperature-compensated or temperature-corrected types;
- (f) servo motors (gear-head or plain), as follows:
  - (1) designed to operate from power sources of more than 300 cycles per second;
  - (2) designed to have a torque-to-inertia ratio of 3,500 radians per second or greater;
- (g) potentiometers, as follows:
  - (1) linear potentiometers with a rated linearity of 0.1 percent or less;
  - (2) non-linear potentiometers with a rated conformity of 1 percent or less.

New List                      Item 1568

Retained without change.

Former List                    Item 1571

Magnetometers of the following types:

- (a) fluxgate;
- (b) electron beam sensing;
- (c) paramagnetic;
- (d) nucleonic; and specialized parts therefor.

New List                      Item 1571

Redefined to read:

Magnetometers of the following types:

- (a) Fluxgate;
- (b) Electron beam sensing;
- (c) Paramagnetic;
- (d) Nucleonic; and specialized parts therefor.

Note: Paramagnetic as used above refers to the sensing of changes in magnetic field strength by measurement of the effects of such changes in the electron spin phenomena.)

Former List                      Item 1572

Magnetic recorders and/or reproducers (other than those designed for voice or music) and specialized recording media, parts and components therefor.

New List                      Item 1572

Retained without change.

Former List                      Item 1576

Centrifugal testing apparatus or equipment possessing any of the following characteristics:

- (a) driven by a motor or motors having a total rated horsepower greater than 400 h.p.;
- (b) capable of carrying a payload of 250 lb. or more;
- (c) capable of exerting a centrifugal acceleration of 8 or more "g" on a payload of 200 lb. or more.

New List                      Item 1576

Retained without change.

Comment                      Item 1576

Being developed as this item appears to be covered by Munitions List item 18.

Former List                      Item 1577

Balloons, 1100 grams or more envelope weight deflated, capable of free flight but non-personnel carrying.

SECRET

New List                      Item 1577

Deleted.

Comment                      Item 1577

Control duplicated by Munitions List item 10 sub-item (e).

Former List                  Item 1579

Electron microscopes and the following parts therefor:

- (a) electron guns;
- (b) electron objective projection and condenser lenses (magnetic or electrostatic).

New List                      Item 1579

Redefined to read: Ion microscopes having a resolving power better than 10 Angstrom units.

Comment                      Item 1579

Definition change results in the loss of most if not all electron microscopes, however, the higher resolution ion microscope which had not been specifically covered was retained.

Former List                  Item 1582

Optical curve generators (grinders, surfacers, and polishers) and parts, capable of producing aspherical curves.

New List                      Item 1582

Deleted.

Comment                      Item 1582

Early investigation could not establish that such equipment was in fact ever produced and that other methods of production were considered satisfactory. On this finding it was decided to delete the item. It is now reported that two high speed machines have been developed by Boston University under an Air Force contract. The item should be re-negotiated for embargo control should the report prove accurate. This item was included on the B&K 1956-57 shopping list.

SECRET

Former List

Item 1584

Oscilloscopes (cathode-ray) and specialized parts,  
as follows:

- (a) oscilloscopes possessing any of the following characteristics;
  - (1) a bandwidth greater than 5 megacycles defined as the band of frequencies over which the loss does not exceed 3 decibels);
  - (2) a time base shorter than 0.05 microseconds per centimeter;
  - (3) containing or designed for the use of multiple beam tubes, or those of 3 or more cathode-ray tubes;
  - (4) employing accelerating potentials in excess of 5000 volts;
- (b) specialized parts and accessories, as follows:
  - (1) oscilloscope cameras;
  - (2) amplifiers and pre-amplifiers with a bandwidth greater than 5 megacycles (defined as the band of frequencies over which the loss does not exceed 3 decibels).

New List

Item 1584

Redefined to read: Oscilloscopes (cathode ray) and specialized parts therefor, as follows:

- (a) Oscilloscopes possessing any of the following characteristics:
  - (1) A bandwidth greater than 12 megacycles per second (defined as the band of frequencies over which the deflection on the cathode ray tube does not fall below 70.7% of that at the maximum point, measured with a constant input voltage to the amplifier);
  - (2) A time base shorter than 0.04 microseconds per centimetre;
  - (3) Containing or designed for:
    - (i) the use of one or more cathode ray tubes having three or more electron guns or
    - (ii) three or more cathode ray tubes;
  - (4) Employing accelerating potentials in excess of 5,000 volts.
- (b) Specialized parts and accessories as follows:  
Amplifiers and pre-amplifiers having a bandwidth (defined as in (a) (1) above) greater than 12 megacycles per second.

SECRET

## Comments

Item 1584

New definition releases oscilloscopes much better than previously allowed - better than required for servicing TV (as was claimed) and will permit the Soviets to more closely approach our military capability in this area. This increased capability will more than double their ability to analyze pulse transients in connection with radar and other electronic equipment design and maintenance. The control of oscilloscope cameras is lost in the revised definition. By using a camera it is possible to record single trace information which the eye cannot retain long enough to analyze.

## Former List

Item 1585

Photographic equipment, as follows: high speed cinematograph cameras, capable of recording at rates in excess of 250 frames per second.

## New List

Item 1585

Redefined to read:

Photographic equipment as follows:

- (a) High-speed cinema recording cameras employing:
  - 1. Film widths 35 mm. or narrower and recording at rates exceeding 3,000 frames per second in the case of equipment using as the lighting source a steady light flow and 10,000 frames per second in the case of equipment using as the lighting source flash equipment connected to the unwinding system.
  - 2. Film widths greater than 35 mm. and recording at rates exceeding 64 frames per second.
- (b) Other high speed cameras capable of recording at rates in excess of 250,000 frames per second.
- (c) Photographic micro-flash equipment capable of giving a flash of 1/100,000 second or shorter duration, at a minimum recurrence frequency of 200 flashes per second.

## Comment

Item 1585

In general the loss over the original definition is that it makes available cameras and flash equipment of extremely high speeds for use in flame propagation, detonation, ballistic testing, recording of "A"

bimb flash, all types of stress studies, Schlieren photography, turbine engine studies, etc. It is quite likely the Soviets have some manufacturing capability in this field, however, it is thought to be limited.

With respect to the new definition some control will continue but in a much more limited field. Under sub-item (a)(1) three commercial cameras are known that would remain under control; under (a)(2) one camera; (b) one camera, and (c) one camera.

Former List                      Item 1587

Quartz crystals (worked or unworked) and plates, radio grade only.

New List                        Item 1587

Retained without change.

Comment                        Item 1587

Being developed.

Former List                      Item 1589

Resistors, temperature-sensitive (of a kind used in bolometers or in the measurement of electric power below 10 milliwatts but excluding electric lamps.

New List                        Item 1589

Deleted.

Comment                        Item 1589

Being developed.

Former List                      Item 1590

Photographic micro-flash equipment capable of giving a flash of 1/100,000 second or shorter duration, or with a frequency of 200 flashes or more per second.

New List                      Item 1590

Delete Item 1590. See Item 1585, sub-item (c).

Former List                      Item 1591

Spectrographs, spectrometers, monochrometers, and associated measuring equipment, as follows:

- (a) grating types with, or designed for use with diffraction gratings (originals or replicas, plane or concave); and gratings therefor;
- (b) prism types:
  - (1) capable of a spectrum length of 20 cms between 9000 and 2000 Angstrom units, or
  - (2) designed for use with prisms having refracting face 35 mm or more in width;
- (c) infra-red types, having an effective total prism base length over 2 inches (5cm);
- (d) recording or controlling desitometers or other specialized equipment for the quantitative measurement of spectra or spectrographic records.

(Note: This does not include: (1) instruments limited to the use of replica plane grating not exceeding 1 inch (2.5 cm) in ruled width, and spares therefor, and (2) instruments of the "circle" type incapable of direct measuring to less than 5 seconds of arc.)

New List                      Item 1591

Deleted.

Comment                      Item 1591

The D-142 position was to retain in a new item 1578 a portion of the original coverage covering spectrographs, spectrometers, monochrometers and associated equipment. There is no new item 1578. These instruments are basic research tools required in both experimental and theoretical study of matter, particularly the atom. Bloc countries, and especially Communist China, have displayed interest in obtaining instruments of this type possibly for quality control at production sites.

SECRET

Former List                      Item 1593

Measuring and counting equipment as follows:

- (a) equipment capable of measuring time intervals of one second or less with an error not exceeding 2% of the interval measured or an error of 20 microseconds, whichever is the greater;
- (b) equipment capable of counting at over 50,000 counts per second.

New List                        Item 1593

Retained without change.

Comment                        Item 1593

Being developed.

Former List                      Item 1594

Voltmeters, as follows:

- (a) DC vacuum tube voltmeters with full scale range of 1 millivolt or less, with or without AC adapters;
- (b) AC vacuum tube voltmeters of laboratory type with full scale range of 0.01 millivolt or less.

(Note: This excludes voltmeters specially designed for testing telephone lines.)

New List                        Item 1594

Deleted.

Comment                        Item 1594

The deletion of voltmeters releases instrumentation using advance digital display techniques. These instruments could make significant improvements in production and maintenance test techniques by reducing measurement time and error probability.

SECRET



Former List

Item 1598

X-ray diffraction and electron diffraction equipment and accessories, as follows:

- (a) X-ray diffraction units;
- (b) X-ray tubes designed or intended for use in X-ray diffraction analysis;
- (c) powder cameras with heating element for temperatures of 500°C (932°F) or above;
- (d) single crystal oscillating and rotating X-ray goniometers with X-ray film or plate holders;
- (e) Electron diffraction units and specialized components therefor.

New List

Item 1598

Deleted.

Comment

Item 1598

This equipment is used primarily for research in the structure of materials. Although the principles are certainly well known in the Sino-Soviet bloc, Bloc production is inferior to that of Western countries and it is believed that the USSR has not acquired manufacturing know-how for satisfactory production.